Greening's Book of Horticulture

Success in Growing Fruit
Depends on Two Things:

1. On the quality of nursery stock, its parentage and its vigor.

2. Environment being favorable, upon the care and culture the stock receives after planting.

Published by
The Greening Nursery Company
Monroe, Michigan

GREENING'S BOOK of Horticulture

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Price Fifty Cents, Postpaid

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THE GREENING NURSERY COMPANY
Monroe, Michigan

OFFICE OF THE GREENING NURSERY COMPANY

FOREWORD

Success with nursery stock depends on its health and vigor and upon the care and culture given it by the grower after it is planted.

This book is dedicated to those more or less uninformed on the subject of Horticulture, who depend upon us for this service.

It has been written especially for the men and women of America who believe in the complete home—one with fruits and flowers —with trees and plants—as well as for the commercial orchardist.

It is comprehensive in its scope, and intended to cover all essential subjects pertaining to nursery stock after it leaves our nursery.

This book has been carefully read and is approved by Prof. C. P. Halligan, of the Michigan Agricultural College of Lansing, Mich.

THE GREENING NURSERY COMPANY
Monroe, Michigan

PREPARATION INCIDENT TO SETTING OUT FRUIT STOCKS AND THE GENERAL CARE OF SAME

CHAPTER I.

The Site and Soil for an Orchard

In the matter of selecting a site for one or more kinds of fruit, the question of soil and location is of utmost importance. On it often depends success or failure. An elevated location having good surface and air drainage is, in most instances, preferable to low, level lands. Even on the highlands, pockets or depressions in the land must be avoided. Avoid extremely hilly or rough land. Underdrainage is recommended on level ground for good results—it makes the soil loose, fertile and warm besides aiding in many other ways. Neither trees nor small fruits will thrive in any location which has a damp and cold sub-soil.

The slope or exposure of a site must also be considered when determining the best location for an orchard. Generally a southern slope warms up earlier in the spring than a northern or eastern exposure. This induces early blossoming and fruiting, which may sometimes be desirable, but trees on a southern slope are more susceptible to sun scald and winter injury than on any other exposure. Fruit growers generally prefer a northern or eastern exposure because they usually have strong soils, are more retentive of moisture and are not so susceptible to winter injury or the late spring frosts.

The different fruits require different types of soil, but all do their best in strong, deep, well-drained soil. In general the apple, cherry, peach, plum and quince do best on a light or gravelly loam soil, while the pear and grape do best on a heavy soil. The apple depending on varieties adapts itself well to a wide variety of soils.

IDEAL ORCHARD LAY-OUT

A few acres of orchard handled in this manner proves exceedingly profitable to the owner. Fruit growing is the most profitable business any land owner can engage in where conditions are favorable for the growing of fruit.

Preparation of the Soil for an Orchard

The amount of preparation necessary on a soil for an orchard will depend on its present condition, at any rate it should be brought into the very best possible state of tilth before planting fruit trees. Give the trees a good start in their younger years and the benefits from such will be seen during the entire life of the trees. As an orchard is planted for a lifetime, one can afford to prepare the soil better than for ordinary annual crops. On soils depleted of organic matter it will be necessary to add it, and remember that barnyard manure is the best all around fertilizer. It should be applied freely and turned under before planting. A green crop, such as peas, corn, buckwheat, cowpeas, soybeans or clover turned under will always be found beneficial. Soil rich in plant food, such as new land, old meadow or pasture lands requires little if any manure at planting time. Underdrainage on wet soils is also absolutely necessary.

The Care of Trees on Arrival

Immediately after receiving the trees or plants from the Nursery they should be thoroughly moistened and wrapped, or covered to prevent drying out. They should be taken home and planted at once, and if unable to plant should be heeled-in. To heel-in chose fine soil in a well-drained location, preferably on a ridge. Dig a trench about two feet deep, throwing the dirt forward, so as to make a sloping bank on which to lay the trees, slanting with the roots in trench. Be sure to cut the bundles open, shake out all the packing and lay the trees in thin layers. Then throw a layer of soil on the roots and on the whole length of trees to the very tips. Work the soil in well around the roots and tops, packing the soil firmly. Dig the trench back further, then put in another layer of trees, covering to tips with soil. Add as many layers as necessary to dispose of all the trees with soil between each layer. Do not be afraid of putting on too much soil. Smooth the sides so as to turn off water and dig a trench entirely around the mound allowing for a ditch to carry off the surface water.

Trees which are to be heeled-in over winter should be placed in a trench with the tops leaning towards the north at an angle of about forty-five degrees. When heeling-in over winter select a place where water will not stand, away from buildings and meadows—in the open field and where the mice will not injure them.

Strawberry, raspberry and blackberry plants should not be heeled-in over winter. When received in the spring if well dampened they can be kept in the cellar until ready to plant, but this operation should not be delayed and they should be planted as soon as possible.

Fruit from a Four-Year-Old Tree

Distance for Planting Most of the old orchards were planted too closely. The planters forgot that in later years the trees would develop large tops and extensive root system. If trees are planted too closely they not only interfere with each other, but also with spraying and cultivation. The planter must take into consideration the longevity and the future development of the species: For example, the peach compared with the apple. The kind and variety of fruit will determine the proper distance to plant, with due consideration given to whether the variety is an upright or spreading grower.

NUMBER OF TREES OR PLANTS REQUIRED PER ACRE

Distance	No. per acre
APPLES	
36x36	33
40x40	27
APRICOTS	
18x18	134
20x20	108
24x24	75
BLACKBERRIES	
3x 7	2074
CHERRIES—SWEET	
24x24	75
30x30	48
36x36	33
40x40	27
CHERRIES—SOUR	
18x18	134
20x20	108
CURRANTS	
4x 6	1815
5x 5	1742
4x 7	1556
4x 8	1361
DEWBERRIES	
3x 7	2074
GOOSEBERRIES	
4x 6	1815
5x 5	1742
GRAPES (TRELLIS)	
8x 8	680
GRAPES (ARBOR)	
6x 6	1210
6x 8	907
PEACHES	
18x18	134
20x20	108
PEARS—STANDARD	
18x18	134
20x20	108
24x24	75
PEARS—DWARF	
10x10	435
12x12	302
15x15	193
PLUMS	
18x18	134
20x20	108
24x24	75
QUINCES	
10x10	435
12x12	302
15x15	193
RASPBERRIES (RED)	
2x 7	3111
3x 7	2074
RASPBERRIES (BLACK)	
3x 7	2074
STRAWBERRIES	
1x 4	10890

CIRCULAR BED PLANTING TABLE

Diameter of bed.	Plants 6 in. apart.	Plants 12 in. apart.	Plants 18 in. apart.	Plants 24 in. apart.	Plants 30 in. apart.
3 feet	28	7			
4 "	48	12	6		
5 "	80	20	8		
6 "	112	28	13	7	
7 "	152	38	17	9	
8 "	200	50	23	12	
9 "	256	64	28	16	
10 "	320	80	36	20	13
11 "	380	95	42	24	16
12 "	452	113	50	28	18
13 "	528	132	59	33	22
14 "	612	153	68	39	25
15 "	704	176	78	44	28
16 "	804	201	89	50	32
17 "	904	226	100	57	36
18 "	1016	254	113	63	40
19 "	1132	283	126	71	46
20 "	1256	314	139	78	50

Another evidence of the Superiority of Greening's trees. We use French Crab roots of the best quality only on which to propagate. This gives additional vigor and thriftiness to our apple trees.

The Selection of Varieties

One of the most important and difficult problems that confronts the fruit grower and farmer, is the selection of varieties for his orchard. In making a choice one cannot be too careful and should be guided not only by one's own preferences, but also by the purpose of the orchard (whether for home or market use) and the locality. If the orchard is for home use it should contain varieties affording a succession of fruits for as large a part of the year as possible. Every variety should be of high quality—part suitable for dessert and part for cooking.

In choosing varieties for the commercial orchard, the fruit grower must consider the demands of the markets which he expects to supply. The markets of this country differ greatly as to their likes and dislikes; as for instance, the east generally wants a white peach, Chicago a yellow one; New York is a good market for Greening Apples, while Boston prefers Baldwins; often a fruit considered inferior in one market is highly valued in another. While this is true to a large extent now, the consumer is gradually cultivating a taste for the choicer varieties. Growers raising fruit for local market should have a proper succession of varieties while a general grower should consider the particular variety that his local conditions are best adapted to.

Varieties differ also as regards their hardiness and adaptability to different climatic and soil conditions. Some varieties do comparatively well almost anywhere, but most of them are more or less affected by different environment. Therefore, the prospective fruit grower should make a careful investigation to determine what varieties do best in his locality and conclude from this which varieties will be best suited to his particular site and soil. In selecting varieties for the commercial orchard it is well not to choose too many. Too many varieties are difficult to care for and sell and will not bring as good prices as four to six varieties.

In planning an orchard for the market it is well to consult those with experience and knowledge upon the subject. It is also well to consult a reliable nurseryman and in this connection we cheerfully offer our services. Our wide range of experience and knowledge of growing fruit for market enables us to give good reliable advice to planters. We will gladly answer all questions in this respect, honestly and fairly. Planters may consult us with the utmost confidence.

Northern Grown Trees the Best to Plant

It is by all means advisable to secure first-class trees. They should be free from injurious insects and diseases, should have a healthy root system, with enough good sized roots to hold the tree firmly in the ground and plenty of fine roots. Not all varieties have straight, smooth trunks, and this should be taken into consideration.

A carefully planted orchard. Note how beautiful when trees are properly aligned.

The best trees to plant, irrespective of climate and location, are such as are grown in a cool and temperate climate. The great State of Michigan is noted far and wide for its cool, moderate and healthful summer climate, making it the most popular health resort of the northern states; also for its great fruit-growing industry. Being surrounded on three sides by the waters of the Great Lakes, it has the most favorable climatic conditions for the growing of hardy and healthy nursery stock. Trees grown in this climate are hardier and better adapted for transplanting than those grown in milder climates, and will make lasting and profitable orchards.

Fruit growers and others should buy trees of known parentage. Stock bred or propagated by the "hit or miss" method will not be profitable. If a dairyman wishes to increase the production of his herd he doesn't select his sires or dams for use in his herd from poor stock, but selects only from those families which stand high in the Register of Merit. It doesn't pay to buy drones, and there are many orchards in the state today that are not bearing satisfactory crops owing to the poor strains from which the trees were propagated. Almost all orchards have a few drones. Many nurseryman have not considered this important factor in the development of nursery stock for fruit growing. We have been selecting our strains for fifteen years and the orchards now planted with our stock are successful and profitable orchards.

Inter-cropping and the Use of Fillers To plant an orchard and then wait for it to come into bearing is a long-time investment and few farmers or fruit growers can afford to wait until then without receiving some returns from the land, with the labor and expense connected with it. This difficulty may be overcome by what is known as intercropping, and the use of fillers. Intercropping means that bush fruits may be planted among the orchard trees until the orchard trees begin fruiting, when the bush fruits may be removed, or fillers may be used; fillers mean an early bearing, or early fruit tree which may be removed after the permanent trees begin to bear. For instance, some growers use peaches as fillers if their location is suitable. Others use cherries; others Kieffer pear, in their apple orchards, and these peaches, cherries or Kieffer pears will bear sufficient, first-class, marketable crops before interfering with cultivation or spraying of the permanent apple trees. As soon as they do, they may be removed and then the land devoted entirely to apple growing. If fillers or intercropping are practiced it must be done with the determination to remove

them just as soon as they begin to crowd the other trees, or when the permanent trees go into bearing and when either plan is adopted greater efforts must be made to conserve the moisture and the fertility of the soil. Of apples, the Wagener, Grimes, Oldenberg, Wealthy and Yellow Transparent are successfully used as fillers.

We have learned that bush fruits can be successfully grown between the rows of a young orchard, even producing in some instances larger and better fruit in places which afford some shade, such as the young orchard, therefore, valuable for intercropping.

Hoed farm products may also be used for intercropping, and for the first two years in a peach orchard, a grower can select that which is best adapted to his location from corn, beans or potatoes. These may also be used for the first three years in a plum or cherry orchard and the first three or four years in a pear or quince orchard and the first five or six years in an apple orchard. Exceptions should be made to the above hoed farm crops where the soil is in poor physical condition and then it should be improved by keeping out all farm crops, applying manure to enrich the soil, cultivating until such time as cover crops can be sown and plowed down the next spring, followed by clean cultivation each week until the middle of July when the cover crop selected should be again sown. This builds up the fertility of the orchard and is the practice of the best growers.

Pollination One of the most important phases of the orchard problem is pollination. Many varieties are known to be self-sterile. This applies to varieties which are unable to set fruit without the aid of pollen of another variety. Inasmuch as all varieties benefit by pollination it is good practice to plant not more than four or five consecutive rows of one variety. Among apples known to be uncertain or self-sterile varieties are the Arkansas, Tompkins' King, Grimes, Jonathan, Gravenstein, Northern Spy, Rome Beauty, Esopus, Twenty Ounce and Winesap.

Those known to be dependable or self-fertile varieties are Ben Davis, Baldwin, Oldenberg, R. I. Greening, Yellow Transparent, Yellow Newtown, Winter Banana, McIntosh and many other varieties but those above contains a sufficient number to satisfy commercial growers.

The pears more or less self-sterile are the Angouleme, Anjou, Bartlett, Clairgeau, Clapp's Favorite, Howell, Kieffer, Lawrence, Louise and Sheldon.

Pears generally self-fertile are Bosc and Seckel.
Plums more or less self-sterile are the Gold Drop, Italian Prune and Satsuma.
Plums generally self-fertile are the Lombard, Damson and Burbank.

Systems of Orchard Planting There are three general systems of orchard planting. They are: The square system, in which the trees are set at the corners of a square, making the rows equi-distant in both directions; the quincunx system, which is the same as the square except that a tree is planted in the center of the square; and the hexagonal or equilateral triangular system, in which the trees are equidistant apart in all directions.

Of these, the square system is the most commonly used because it is easily laid out, is the easiest to cultivate and permits of systematic and definite thinning out when the trees begin to crowd each other. This system does not permit of planting as many trees per acre as the other systems.

In the following diagrams, P—permanent; F—filler.

P F P F P F P
F F F F F F F
P F P F P F P
F F F F F F F

Square System with Fillers

The square system is easily modified into the rectangular system, in which the rows are farther apart in one direction than the other.

Planting on the quincunx system permits of an increase in the number of trees per acre, from 45 per cent in small orchards to 98 per cent in large orchards.

P F P F P F P
F P F P F P F
P F P F P F P
F P F P F P F

Quincunx System with Fillers.

The advantages of this system are the same as those of the square system. In the first thinning out, all of the trees designated by F will be removed; later each alternate cross row of trees designated by P will be removed, thus leaving the orchard on the square system.

Laying Out the Orchard

The laying out of an orchard, even on level ground, is not a difficult problem, but it is a matter that should never be slighted. An orchard in which the rows are straight is always much more attractive and satisfactory than one which appears to have been carelessly planted and is worth the extra care and time necessary.

The very first step to take in the laying out of an orchard is to establish a base line. This is preferably done along the longer side of the field and from which all further operations will extend. If you are planning to set out the orchard according to the square or quincunx systems and the field not larger than 3 or 4 acres, and is comparatively level, another line should be run out at right angles to the base line, starting at the corner of the field where the first tree will stand. Be sure that this second line forms a perfect right angle with the base line. A good way of ascertaining the direction of the side lines is by placing a carpenter's or mason's square so that one side extends along the base line with the corner of the square at the end of the line. By sighting along the other side of the square, one has the direction of the side line. A satisfactory planting square can very easily be made of straight boards by fastening them as shown in the above figure to form a true right triangle. No matter what the shape of the field is, always begin staking out on a true square. After the two side lines have been found it is an easy matter to determine the line opposite the base line, by simply connecting the ends of the two side lines.

Stakes can then be set along all four sides of the field at intervals corresponding to the distance the trees are to be set apart. From corresponding stakes on opposite sides, a wire can then be stretched tightly across the field. This wire should be at right angles to the two sides from which it extends and parallel to the other two sides. Such a wire will indicate the position of the rows of trees. String is not as good as wire because it is apt to stretch and cause the rows to be crooked. Fasten firmly several turns of stove wire along the wire at intervals equal to the distance apart the trees are to be set in the row. Stakes should then be driven into the ground at the position of the marks on the planting wire, and the next row then placed in the same manner. After the orchard has been staked or even after the first row has been staked—the planting may begin.

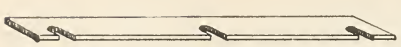


Fig. 1—The planting board made from inch board 5 feet long, 3 inches wide. Cut notches for stakes.

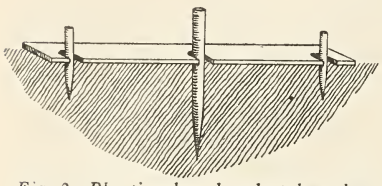


Fig. 2—Planting board and stakes placed in position before digging holes.

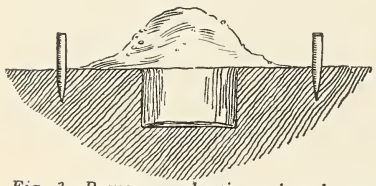


Fig. 3—Remove planting board and center stake, don't disturb the small stakes. Dig the hole.

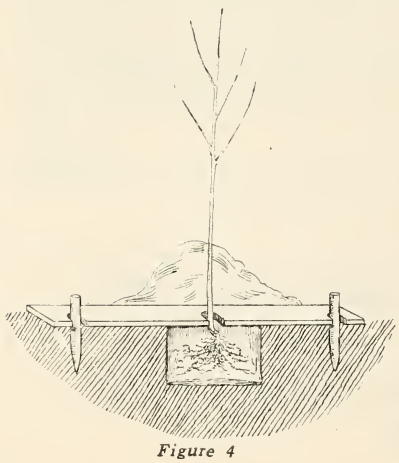


Figure 4

Planting Board The planting board is a board six inches wide and about five feet long, notched as shown in the picture. Place the board at the middle notch against the stake, and drive small stakes in end notches as shown in fig. 1. Next remove board and dig the hole, leaving end stakes in place, fig. 2. After the hole is dug place the board against the two end stakes and replace the large stake as shown in fig. 3. In planting always place the tree close to the stake.

When large orchards are to be planted a more extensive method of planting must be used, but the following simple plan will be found quite accurate if the work be carefully done. As shown in the following diagram, rows of stakes are set completely around the field and near enough to the edge of the field so as not to interfere with any of the trees that are to be planted. Then two other rows of stakes are set at right angles across about the middle of the field and again avoid the location of any trees to be planted. These rows of stakes need be in straight lines spaced in the rows at intervals equal to the distance at which the trees are to be planted. If the field is rolling or if for any reason the planters cannot see entirely across the field more cross rows of stakes will be needed.

Where the field is very rolling it may become necessary to establish the lines of the rows by means of setting across the field from end to end and placing line stakes on top of the hills.

Pruning Roots Before Planting The soil should be in the best of condition, smooth and in good tilth. In preparing a tree for planting, all mutilated or injured tips of roots should be trimmed off, and large slender roots cut off to correspond with the length of the main roots. When the young trees are dug in the nursery a small portion of the root system is necessarily removed and a few of the roots may be broken. However, by the Greening method of digging trees, practically all of the roots are left on the tree, and there is but little danger of injury. In handling the trees every precaution should be taken to prevent the roots from becoming dry. Undue exposure during the period that elapses between the trimming and the planting of the trees will injure them.

Planting the Trees In digging the hole before planting make it wide enough and deep enough so the roots can be spread out in their natural position and not crowded, and when digging, it is a good plan to keep the top soil and the sub-soil separate, and when planting use the top soil down around the roots, as it is more fertile than the sub-soil.

It is also well to put a little well rotted manure in the bottom of the hole, covering it with several inches (3) of top soil. In planting the trees after they have been properly root pruned several important precautions must be observed if the desired success is to be realized.

In filling the hole after the tree has been put in position and properly aligned only finely pulverized top soil should be used. In this part of the operation much care should be taken to work the soil in closely about the roots. Moving the tree up and down very slightly as the hole is being filled will also materially help settle the soil around the roots. This soil is then tamped firmly with foot, and more soil added

PLANTING AND PRUNING APPLE, PEAR, CHERRY AND PLUM

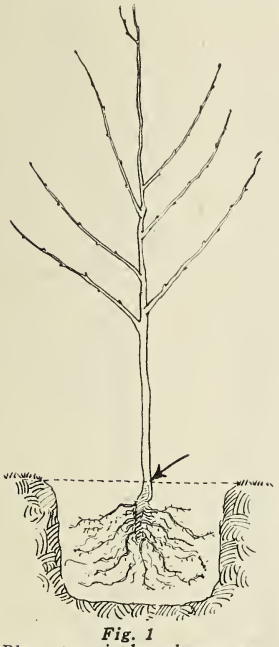


Fig. 1
Plant two inches deeper as shown.

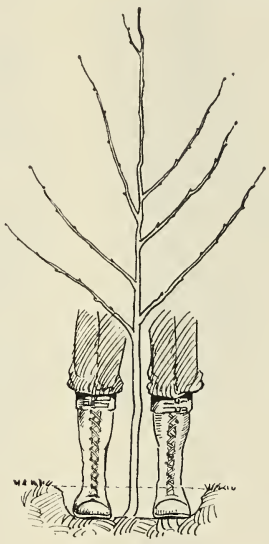


Fig. 2
Tamp firmly with foot.

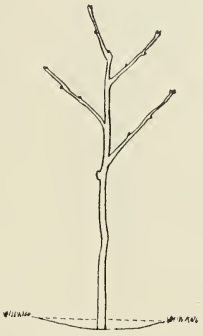


Fig. 3
Prune as shown, four buds to each branch, leaving four branches. Leave slight hole as shown.

and tamped, but leave a thin layer of loose soil at the surface after the hole is completely filled. After the tree is planted it should stand about two inches lower in the ground than it formerly did in the nursery. (See illustration page 11).

It is possible for one man to do the planting alone, but for convenience and rapidity two men can work better together. One man can set the tree in its proper place and spread the roots while the other throws in loose soil just a little at a time as above described. The ground surface around the tree should be slightly depressed after planting to catch the water. Banking up should be avoided.

Cultivation During the first three years of an orchard, keep the land well and deeply cultivated to force the roots to grow deep. The practice thereafter is to cultivate shallow and often, to maintain a loose surface to prevent evaporation of moisture. The importance of tillage primarily is to hold the moisture which enters the soil during the spring rains over the summer or drouth period and to hold moisture from any subsequent rains and secondarily to keep the surface clean of weeds. In doing one thoroughly you do the other. A loose surface of three or four inches is of sufficient depth to retain the moisture beneath it. The tools generally used for surface tillage are the smoothing harrow, or the spring-tooth harrow. It is surprising to see how the tree or plant will respond to good thorough cultivation. The stirring of the soil with hoe or cutivator stimulates the vigor of growth, enlarges the root system, prevents a check in the growth of the plant, and carries it thru to maturity with safety. The fruit growers should follow this practice diligently to insure a successful orchard. If he is haphazard and doesn't cultivate regularly he cannot expect to grow trees successfully, no more than a farmer who plants corn can expect to make a profit without cultivating it.

Implements A disc or spring-tooth harrow seems to be about the best all-round implement to use during the growing season, especially on light soil. During the dry season use a tooth harrow, and go over the ground as often as once a week to prevent evaporation of moisture from the soil. A man with a harrow and team can go over a large space in a day, and keep down the weeds in a large orchard at a small expense if worked at the right time. In heavy soils, shallow plowing in the fall is very essential. Harrow and work crosswise and lengthwise. Use a hoe or special extension harrow around the trees. If cover crops are planted a turning plow and grain drill will also be very useful.

PRUNING PEACH TREES
The pruning of peach trees at planting time to form a low crown consists of cutting back the top to about two feet above the ground, after planting, leaving spurs as shown in illustration one inch long. In case there are no branches to cut to spurs, the buds on the tree will answer the purpose of the spurs, and form a perfect head.

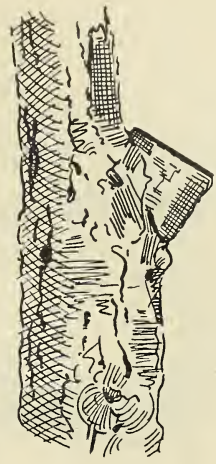
PRUNING APPLE, PEAR, PLUM AND CHERRY TREES

Prune off all the branches except the upper three or four; these cut back to spurs about six to eight inches in length. Good judgment is necessary in selecting branches for the crown, such as will form an evenly balanced head.

Fertilizing In bearing orchards liberal manuring is advised. Barnyard manure stands in the lead as an all-round fertilizer. For peaches, cherries and plums a fertilizer rich in potash and phosphoric acid is best. Ashes in sand soils, or on lands deficient in potash, are of greatest value. They should be spread broadcast over the surface and harrowed in. The value of ashes as a fertilizer for fruit crops is not being sufficiently appreciated; they are highly recommended by such authorities as Professor Bailey, and we notice that all fruit growers using them usually grow the finest fruit. Every bushel of ashes should be saved and kept in a dry place for future use. Plowing under green, leguminous crops, such as crimson clover, cow-peas or field-peas, is excellent for recuperating bearing orchards. Sometimes the legumes will cause too great a growth of wood. In such cases non-legumes will often be found very valuable as green manure.

Cover Crops Cover crops are essential in stimulating the fertility of the soil and as a winter protection. When clean cultivation is practiced it should stop sometime between the middle of July and the middle of August, depending on the kind of orchard, location, etc., and a cover crop should then be sown. If growth of the trees needs to be aided it is well to plant a leguminous cover crop such as clover, beans, peas, soybeans, vetches etc., which will add nitrogen to the soil, otherwise plant such non-legumes as oats, rye, buckwheat, etc.

Correct method of cutting off large branches.



Wrong method of cutting off large branches.

Red or June clover for clay loam soils—plant July 15th to August 1st at the rate of 15 or 20 pounds per acre.

Winter (hairy) and Spring vetch for sandy loam—The former is the more hardy of the two. Plant July 15th to August 15th at the rate of 1½ bushels per acre. The latter should be sown about August 1st at the rate of two bushels per acre.

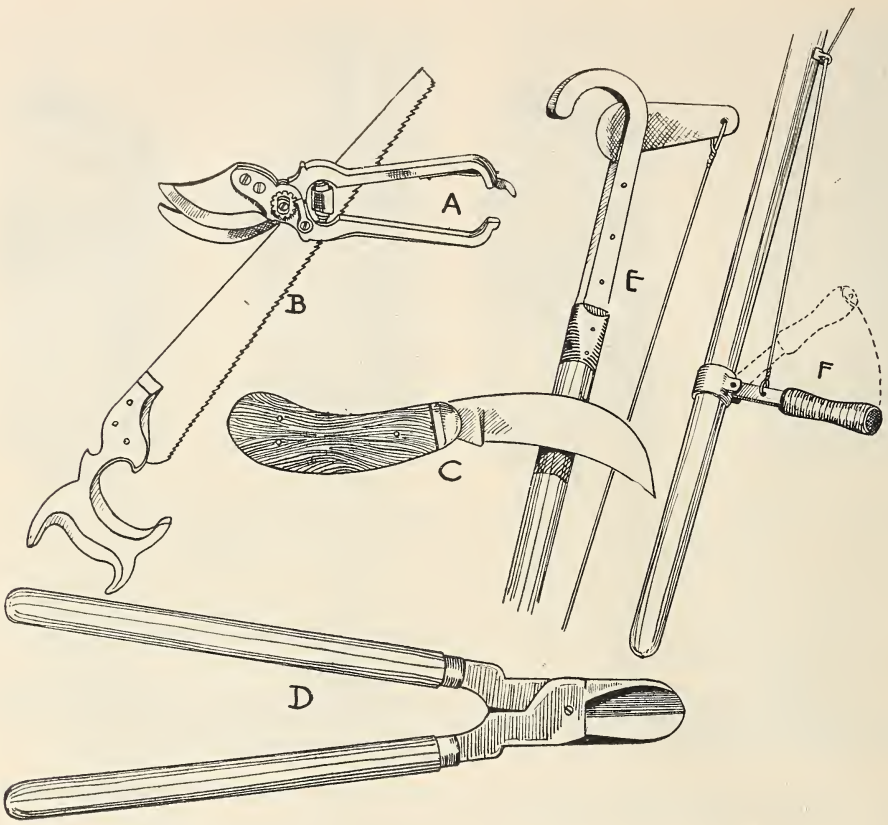
Rye—our best general purpose cover crop for over winter. Very good on heavy soils. In spring plow under before it becomes too woody.

Oats—Should be used where a cover crop that dies over winter is desired.

Pruning Fruit trees are pruned for the purpose of enabling them to produce a superior quality of fruit. Pruning fruit trees usually resolves itself into a thorough and systematic thinning out of the weak, imperfect and interfering branches, thereby saving the energy of the plant and deflecting it to those parts of the plant which are capable of bearing a useful product. The reasons for pruning may be ranged under eight general heads, as quoted in Bailey's Encyclopedia of Horticulture:

1. To modify the vigor of the plant.
2. To produce larger and better fruits.
3. To keep the plant within manageable shape and limits.
4. To change the habit of the plant from more or less wood bearing or fruit bearing.
5. To remove superfluous or injured parts
6. To facilitate spraying and harvesting.
7. To facilitate tillage and to improve the convenience of the plantation.
8. To train the plant to some desired form.

Prune every year during the month of March. Aim to develop and maintain a uniform and well balanced head, supported by a good stocky trunk and main branches. Note the habit of the trees: if spreading in growth, confine your pruning more to the side and top branches; if pyramidal in growth, thin the center and head on the top to cause spreading of the branches, so that the sun and air will have free access. The object is to maintain open center to admit sunlight and get better colored fruit.



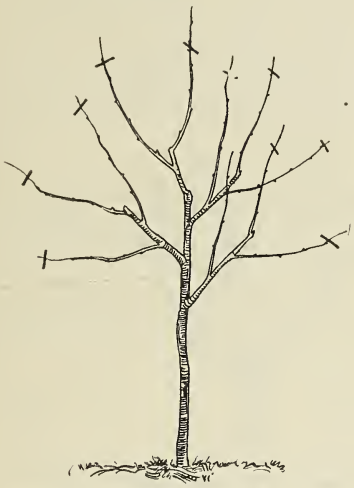
Pruning tools. Keep well sharpened.

The richer the color of the fruit and larger the size, the greater the profit. Better have less fruit that is good than more fruit that is poor. Quality brings better net returns than quantity.

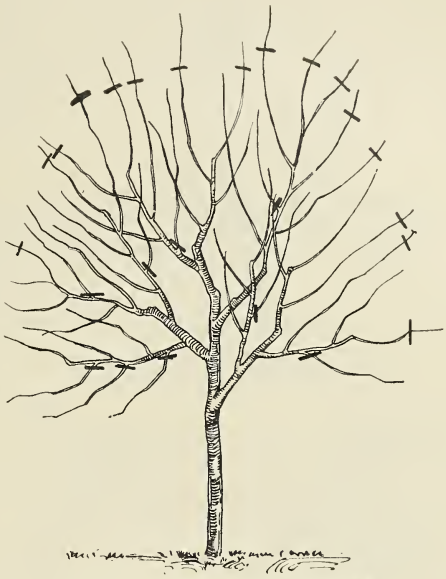
The training of a young fruit tree from the time of planting up to the time of fruiting should be along the lines of developing a strong framework, consisting of four or five main lateral branches spirally arranged around the trunk at different points to avoid too many crotches. The main branches should be headed back each year to force them to become stocky and capable of bearing a large crop without breaking down. Keep the center of the head open by cutting out any limbs which grow in or toward the center. Cultivate frequently to produce vigorous growth.

The treatment after the fruit tree has come into bearing is somewhat along different lines. The framework of the tree has been built; this should be maintained as much as possible. Cut dead and interfering branches. Interfering branches are those which cross each other or grow in a direction which will interfere with one of the main branches. Cut the least desirable one. Never allow any succulent growths to remain on the trunk, crotch or within a few feet of the crotch along the main branches. Do not prune too severely, but at the same time do not be afraid to take off where too much crowded. Do not allow a tree to grow too high. Keep the head low to facilitate picking of fruit and spraying.

Peach pruning is practically on the same order as other tree fruits, except that more wood is removed and more severe pruning is practiced. After the peach tree has come into bearing, more severe pruning is necessary than with any of the northern-grown fruits. At least one seventh of the entire foliage-bearing area is removed each year. Head back the tops slightly each year; not too severely for reason that heavy



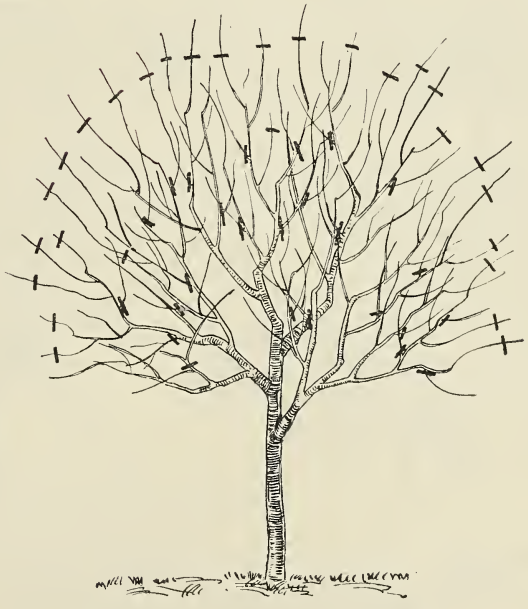
Pruning Apple, second Year



Pruning Apple, Third Year

heading back checks the terminal growth and the vigor of the tree is deflected into the many buds within the tree, thus causing a bushy growth which will tend to fill in the open center.

Do not begin to prune a tree until you have studied it from every angle. First observe the general shape and framework of the tree and picture in your mind what it will look like after pruning. Then observe those limbs which are interfering or will interfere with each other. Before cutting a large limb, be sure that you are not destroying the balance of the tree. Always keep in mind what will become of a limb if allowed to remain. In which direction will it grow? Will it interfere with another limb, one or several years later? Should it be necessary to remove a limb important in the framework of a tree, be sure to leave one or two young limbs which eventually will replace it. When in doubt about removing a limb, do not cut it. You will know when you prune again the following year what should be done with it.



Pruning Apple, Fourth Year

Provide yourself with a good pruning saw, a strong, sharp pruning knife, a large and a small pruning shears, and a suitable ladder. Sharp tools are absolutely necessary.

In pruning, make the cut clean and smooth. Be particularly careful in handling your tools not to skin any of the bark of the tree unnecessarily, especially while sawing off large limbs at the crotch of the tree. The weight of the limb may cause it to break

Peach Pruning, Second Year

Spring Peach Pruning Third Year

off before you have sawed through it. To avoid such an accident, make an upward cut about one-third through the under side of the limb a few inches above the point where you intend to make your final cut. Now make your final cut, and make it as close to the remaining limb as possible without making a very large wound; leave no large humps nor any long stubs, which never will heal over. When large limbs are cut off, cover the wound with pure asphalt in liquid form, trade name "Scaro", to prevent cracking and entrance of disease. See illustrations on pruning.

Spring Peach Pruning, Fourth Year and Thereafter (See Instructions).

Thinning If large fruit of good quality is desired rather than quantity, it will be necessary to thin out where clusters of fruit have developed on a fruit tree. Thinning is accomplished to some extent by removing a portion of the fruit-bearing wood during the dormant season, as was shown under pruning. More through thinning consists of carefully removing spotted, stung, ill-shaped fruit and also the healthy fruit, allowing one fruit to remain every three or five inches along the stem. The proper time to thin out fruit is after the imperfectly-developed green fruit has dropped, and when the green fruit has attained about the size of one thumb's nail. This time usually comes about the latter part of June.

Do not tear the fruit off; turn or twist it off. Be careful not to injure the fruit spurs on apples and pears.

Healing Bruised or Injured Trees Whenever a tree receives even the slightest injury or bruise, never fail to take care of it, as it may mean life or death to the tree. Merely bandaging the wound may be all that is necessary. if the wood or bark is torn and ragged, the rough edge should be cut away smooth with a sharp knife. Grafting wax or a compound of three parts clay and one part of fresh cow dung mixed thoroughly into a paste, are both good to apply over the wound. After applying it should be bandaged.

THE PRODUCTION OF APPLES AND PEACHES IN THE UNITED STATES FROM 1910 TO 1920

The Bureau of the Census of the Department of Commerce announces the following, taken from the 1920 census of Agriculture in the United States with comparative figures for 1910:

Apple Trees of Bearing Age.

1920	115,265,029
1910	151,322,840
Decrease	36,057,811

Percent of decrease 23.8%

Apple Trees Not of Bearing Age.

1910	65,791,848
1920	36,171,604
Decrease	29,620,244

Percent of decrease 45.0%

Peach Trees of Bearing Age.

1910	94,506,657
1920	65,654,921
Decrease	28,851,736

Percent of decrease 30.5%

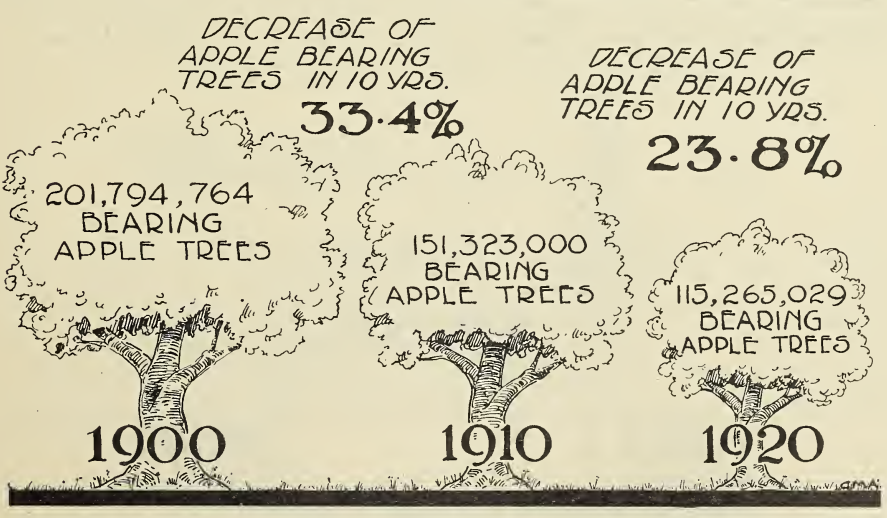
Peach Trees Not of Bearing Age.

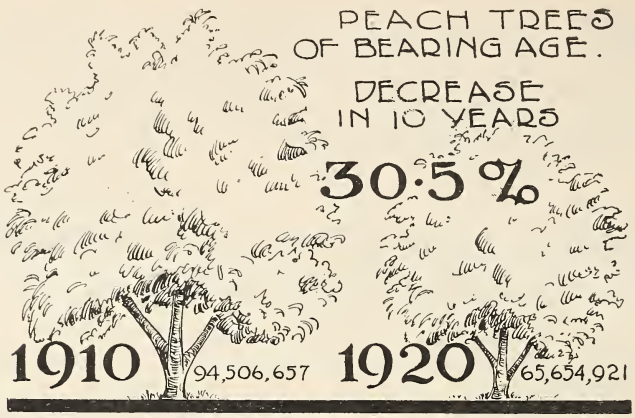
1910	42,266,243
1920	21,623,657
Decrease	20,642,586

Percent of Decrease from 1910 to 1920 48.8%

Apple Trees The number of trees which have reached the bearing age indicates the present status of any orchard fruit. The number of such apple trees in 1920 (including all trees which were old enough to bear fruit at the time of the enumeration, even though they may not have borne any fruit in 1919), was 115,265,029, as compared with 151,322,840 in 1910, representing a decrease of 36,057,811 trees, or 23.8 percent.

One of the most significant indications of the progress or tendency in the growing of any orchard crop is the number of young trees and orchards which have not yet reached bearing age. The number of apple trees not of bearing age reported in 1920 were 36,171,604, as compared with 65,791,848 in 1910. These figures indicate a decrease of 29,620,244, or 45 percent.



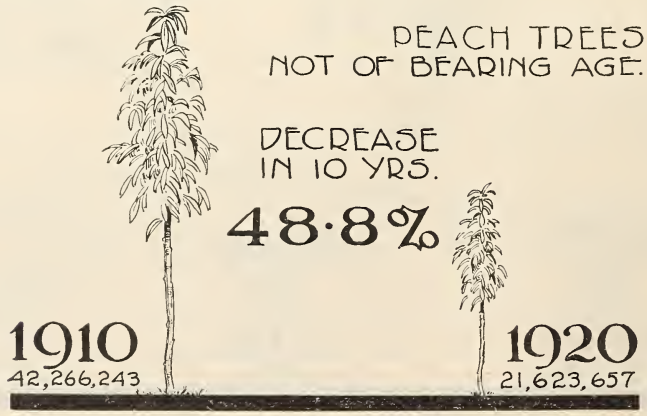


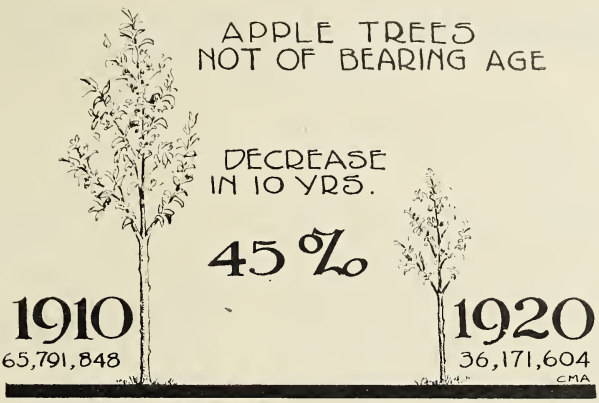
Peach Trees The number of peach trees of bearing age in 1920 was 65,654,921, as compared with 94,506,657 in 1910, representing a decrease of 28,851,736 trees, or 30.5 percent.

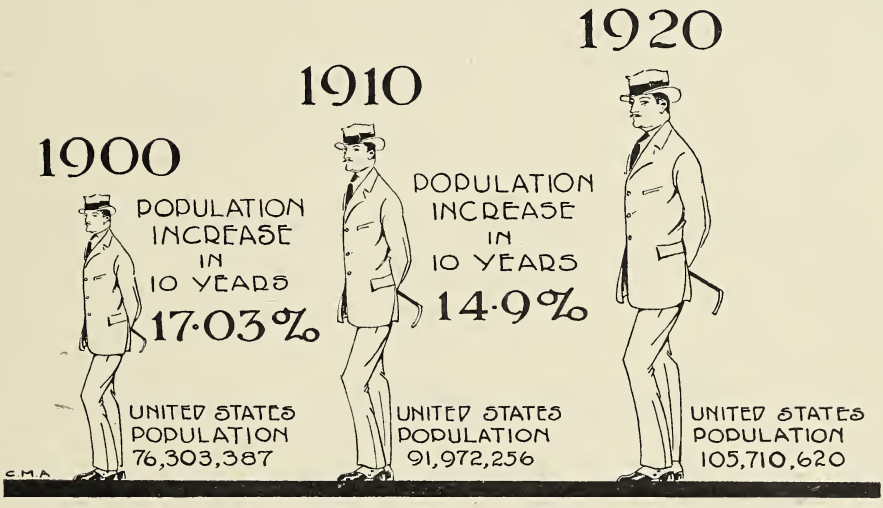
The number of peach trees not of bearing age in 1920 was 21,623,657, as compared with 42,266,243 in 1910, a decrease of 20,642,586 trees, or 48.8 percent, in the last ten years.

This bears out the statement made on page 19 of this pamphlet as to the decrease in production of fruits in the United States in the last decade. This is the very best reason why apples and peaches should be planted in quantity at once, because our population is jumping ahead as explained on page 19. It is estimated that in 1930 the population of the United States will be 130,000,000 and the census figures show that the decrease in apple production in the decade from 1900 to 1910 was 33.4 percent and the figures given above show that apples decreased in the decade from 1910 to 1920 six percent. Also note the large percent of decrease in trees of bearing age and trees not of bearing age. This will result in a large decrease in production in the next ten years and the prices of standard fruits will be higher than ever known. It is bound to be so because the decrease of production and the increase of population will bring it about, and the law of supply and demand holds good in the production of fruit just as in any other commodity.

We ask you, as an intelligent citizen, to consider these things wisely and well. Money invested in the growing of a commercial orchard is safe—much safer than the buying of industrial stocks and investment in wildcat schemes, which are offered every day to men of means. The market for fruit is right at your door; you do not have to look for location. There is no reason why you cannot market all the fruit that you grow right at home providing you grow your fruit as it should be grown.







Population of the United States

		Increase
1900	76,303,387	
1910	91,972,256	17.03%
1920	105,710,620	14.9 %

These true figures show a tremendous increase of 17.03 per cent of apple consumers, and an alarming decrease—33.4 per cent—of apple trees of bearing age between the years of 1900 and 1910, and 23.8 per cent between the years of 1910 and 1920. Also note that apple trees not of bearing age decreased 45 per cent in the last 10 years as shown at top of this page. With the enormously increasing population of this country, there is bound to be a tremendous shortage of apples in the near future, if not already. The demand is greater than the supply, the price raises proportionately. No better indication of this fact is evidenced than by the present price of wheat and other food products.

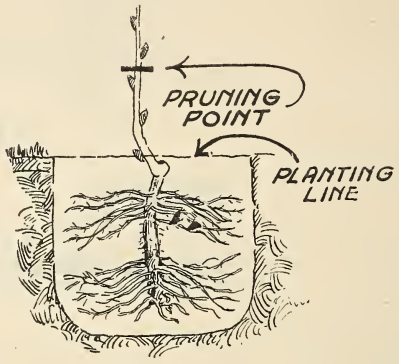
DEPARTMENT OF SMALL FRUITS

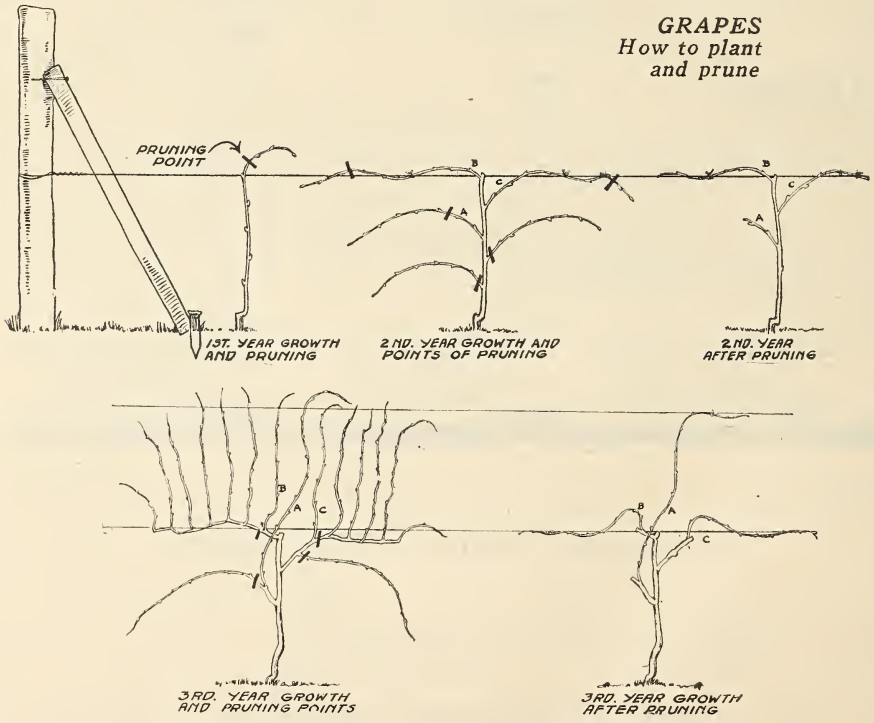
CHAPTER II.

The Grape Any well-drained fertile soil will produce a good grape crop. The soil should be plowed and worked before planting is done.

Distance to Plant Rows should be 8 feet apart and the vines should be planted 8 feet apart in the row.

Planting Dig holes large enough to contain the root system without crowding. Place the vine in the hole so that the first bud next to the stem will come on a level with the surface; spread the lower layer of roots in a natural position. Fill in the soil and press firmly down with foot. Then spread the second layer of roots and fill in the balance of the hole and press gently with foot. After planting trim the vines to three buds.





GRAPES
How to plant and prune

Treatment After Planting If the three buds develop canes during the summer remove the weakest cane, permitting two canes to trail. It is not necessary to tie the canes to a stake.

Treatment Following Spring After Planting Pruning consists of removing one cane entirely and cutting back the remaining one to three buds. This operation should be done during February or March. It must be done before April 1st.

Trellis Some grape growers erect a trellis the third year, but it is better to do it the second season. Use posts 8 to 9 ft. long and place them one at every third vine, bracing the end posts securely. Choose the largest and strongest posts

for the ends of the rows. Set them two feet in the ground; set the end ones first. After all posts are set, stretch the first wire 24 to 28 inches above the ground. Fasten the wire with staples, driven three-fourths of the way in. The second wire should be 44 inches and the third wire 60 inches from the ground. Use No. 11 wire. It is not necessary to stretch any more than one wire at first season.

Train the cane to the first wire of trellis. Cultivate thoroughly, and cultivate between the rows to stimulate growth.

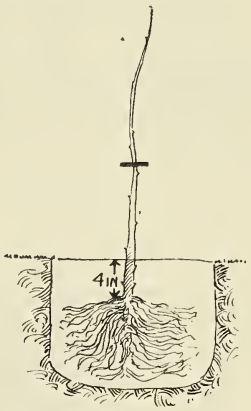
Picking Gather when fully colored and sweet. Too many grapes are picked too green and are a great detriment to the market early in the season. Unripe grapes are injurious to health and are relished by no one. While picking handle very carefully, lay them gently into the basket. Use a strong, stiff eight or ten pound basket. Two pickings should be made, as those exposed to the sun will ripen first. Use a spring wagon for hauling. Grapes may be kept for a considerable length of time after picking, even into the winter if handled with proper care, and kept in a cool cellar or storage where the air is not too damp and the temperature even.

Berry Culture Red raspberries, black raspberries, blackberries, dewberries, currants and gooseberries ae classed under the term "bush fruits". Hereafter when we speak of bush fruits the term will include all of the above classes of fruits.

In our many years of experience we have found that any well-drained soil of good fertility will produce a good yield of berries if the plants are not neglected. Anyone can grow bush fruits, or in fact, any fruit, if he knows that the yield of a cultivated plant is directly proportional to the amount of care or cultivation that the plant received. Of course, there are several fundamental principles that are very important to successful fruit growing, but none of them are beyond the understanding of any man. These fundamental principles will be herein set forth in a concise and boiled-down manner. All of them are based upon good sound reasoning, and are the result of many successful years that The Greening Nursery Company has had in the production of these fruits. You can rely upon them absolutely.

Planting Bush Fruits Preparatory to planting, the soil should be enriched by plowing or spading under a liberal dressing of well-rotted manure. This can be done during the fall or early spring, preferably in the fall as the freezing action of the weather upon plowed land during the winter improves the physical condition of the soil to some extent.

Exercise the same care in planting bush fruits as in planting fruit trees. Dig the holes deep enough and wide enough to accommodate the entire root system spread out in a natural position, without crowding. Set them about two inches deeper than they stood in the nursery row. After the roots have been properly placed in the hole, cover them with several inches of top soil; work it thoroughly between the roots to avoid air spaces and tamp the soil firmly with foot. Fill in the hole with soil, level it off and loosen the surface to prevent evaporation.



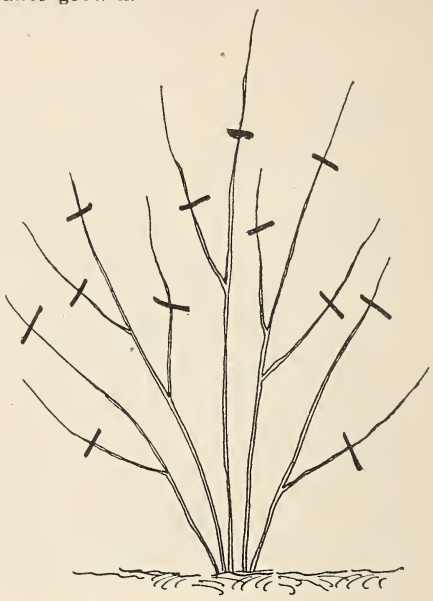
Planting and first year's pruning of raspberries.

Cultivation The reason for cultivation has been explained under fruit trees. What applies to fruit trees applies to bush fruits. The cultivation is nearly identical. It should be shallow, as the roots run near the surface; deep cultivation may cause injury to the roots. Two or four inches is sufficiently deep to retain the moisture in the soil (two for light soils, four for heavy soils). Of the bush fruits, the gooseberry is the greatest moisture lover, hence cultivation should be thorough and frequent. Begin cultivation as early as possible in the spring and repeat every two or three weeks until picking time, except during the time that the bushes are blossoming. Occasional hoeing between the plants may be necessary to keep obnoxious weeds under control. If this plan is carried out, success is almost certain and profits for the little extra labor big.

Pruning The reasons for pruning small fruits are treated upon in a general way on pages 13 to 16. More severe and a more definite system of pruning is required on bush fruits than on tree fruits, due to the fact that bush fruits produce too much foliage area in proportion to the root sysem, thus not only reducing the vigor and yielding capacity of the plants, but also making them more susceptible to the attacks

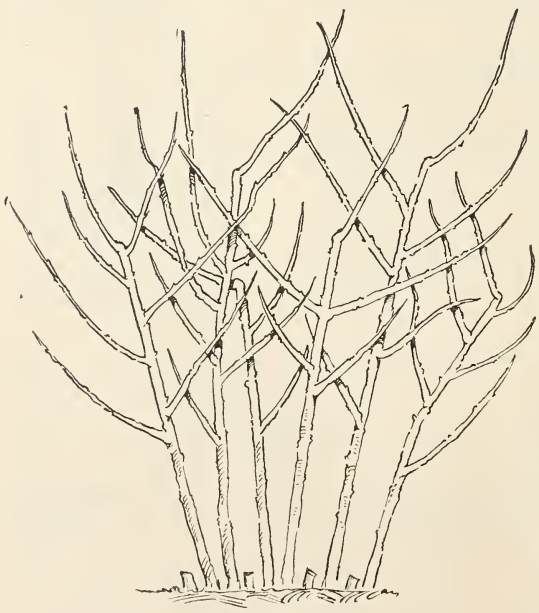
of disease. By removing several canes of the plants during the dormant season, the crude sap, which at that time is stored in the root system, will have less surface to supply during the growing season, consequently producing a healthier and more vigorous growth not as subject to disease as a weaker growth.

Spring pruning of red raspberries after first year.



Spring pruning of black raspberries

Blackberries and Raspberries The system of pruning blackberries and black raspberries is identical to that of the red raspberries with one exception. The young canes of the former are pinched back immediately after the fruiting season, and the latter is never treated in that manner.



Blackberries—Showing how branches are formed by nipping back and cutting off old stalks after fruiting.

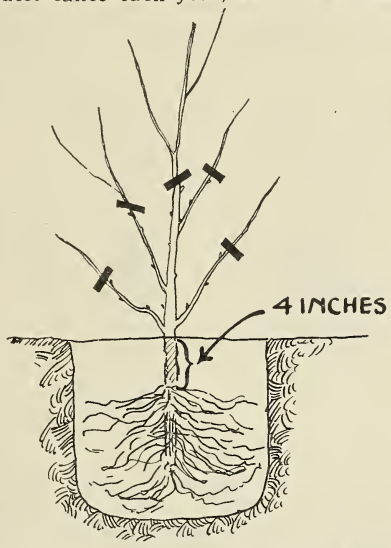
Pruning First Year After the young plants have been planted and while they are yet dormant, all canes are cut back to within 4 to 5 inches of the ground, and allowed to grow at will during the growing season. During this time the roots will become well developed and the young will produce a vigorous growth. Cultivation should be frequent to encourage a heavy production of wood. No fruit of value will be borne on plants during first season.

Pruning Second Year Blackberries and raspberries bear fruit on canes which grew the preceding year, and having borne once, these canes become worthless. Pruning of these fruits during the second season and each season thereafter consists in removing superfluous shoots from the base of the plant, allowing five or six vigorous canes to each hill, and heading back each cane to within 3 or 4 feet of the ground, and finally cutting out the canes after they have borne fruit (which should be done in general soon after the fruit is off). See illustrations for pruning

Pinching back consists in heading-in from 2 to 4 inches of the tips of the young growing canes of blackberries when they are from 2½ to 3 feet high; of black raspberries when they are from 1½ to 2 feet high. This practice causes the young shoots to throw out vigorous laterals which are allowed to grow their full length. Early the following spring these laterals are shortened. From 12 to 20 inches is the length at which these laterals are generally left. It must be remembered that these laterals are to bear most of the fruit, hence it is important that they make a good growth. Red **raspberries should not be pinched back.**

Dewberries Dewberries should be grown in hills. After fruiting all old cane should be removed, cutting close to the ground. Prune during March. Allow from five to six canes two and one-half feet long to stand for fruiting.

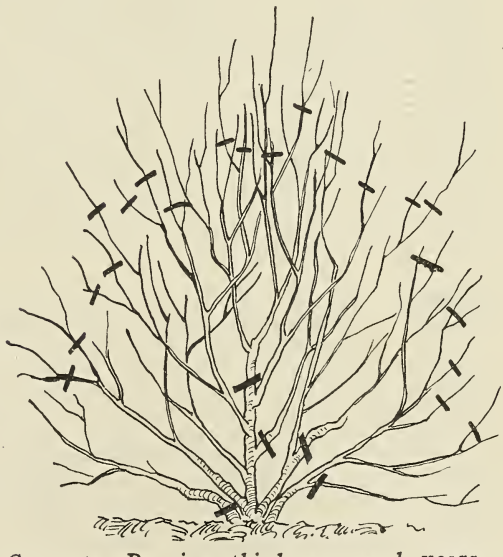
Currants and Gooseberries The canes of currants and gooseberries bear several times, but the first two or three crops are the best. It is therefore desirable after the plants have come into bearing to cut out one or more of the oldest canes each year, and to encourage as many new ones. The bush is therefore, constantly renewed. If the old canes are allowed to remain, the fruit becomes small, the bushes get too tall and the currant borer is encouraged.



Planting and pruning of Currants

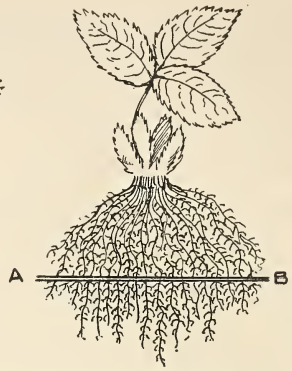
Before planting remove all broken or bruised roots, thin out the top to three or four stems, and cut the canes back to 8 or 10-inch lengths. They require very little pruning during the first two or three years after they are planted, except to head back the new shoots so that fruit spurs will develop all along the canes, leaving five or seven canes per hill. Besides heading-in to keep the bush in shape, the pruning consists of removing the broken branches, or those that droop too closely to the ground. Each year thereafter one or more of the oldest canes, no longer productive, are removed, and as many new ones encouraged. Ship berries in quart boxes crated.

Currants—Second year, no pruning to be done.

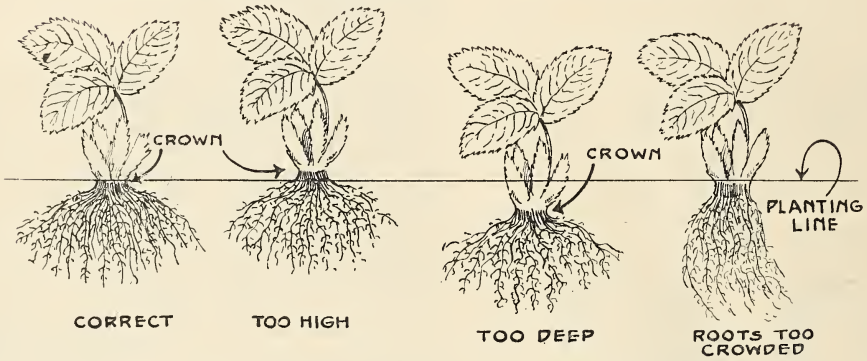


Currants—Pruning third year and years following.
Note heading and removal of old canes.

Prune roots before planting.



Before planting.



Strawberries Strawberries will grow in almost any soil with good results, unless it be a dry sand or an undrained bed of mulch. The richer the soil the larger the crop, hence the neceessity of making it rich by manuring and draining to keep it warm. For best results the land should be made fine and mellow before setting the plants. Set out the young plants as soon as possible after receiving them, and do not expose them to the sun for any length of time. Before setting them, remove all leaves except one or two of the thriftiest, and clip off one-third of the roots. Keep the beds free from weeds and cultivate frequently. Pinch off all blossoms during the first season, as they must not be allowed to bear fruit until the second season. Runners will develop in July, and before they take root train them around the parent plant like the spokes of a wheel, having the parent plant for its center. Throw sufficient earth around the runner plants to hold them in place. Immediately after the ground has frozen in the fall, cover the beds with a 3-inch mulch consisting of either clean straw, marsh hay or a similar substance. Remove the mulch in the spring after all freezing nights are over.

Picking Berries Provide yourself with 16-quart crates for all berries except red raspberries, which, on account of their softness, require special 24-pint crates. Do not be tempted to use a dirty crate even if given you. In selling, everything depends on having fine, large fruit put up in attractive packages. Give each picker a stand, to hold four quart boxes, and instruct them and see to it that they handle the berries much more carefully than they would eggs. If you have a good variety and have cared for them well there will be very few small ones. For strawberries, round up the box well and turn the stem ends of the top ones down. This gives a showy appearance, and is much better than topping off with extra large ones. Customers like to receive a full quart with just as good berries at the bottom as at the top of the basket. For a market one hundred miles or more distant, berries must be picked in a very firm and just ripe condition and shipped by express. If possible, engage one party to take all your berries at a uniform price; an enterprising groceryman for your home trade, or a reliable commission merchant, if you are obliged to send to a city. You will not be likely to make a bargain in advance with a commission merchant

unless your berries are well known to him. In a home market it is a great advantage to be able to deliver your berries and have them off your hands. Women are preferred as pickers, then girls, then boys. To have picking well done requires close supervision. To be successful your picking must be well done at any cost. Avoid jolting in carrying berries to market or depot. Have commission men report condition on arrival, and bring every influence to bear on railway and steamboat men to have them handle the crates carefully.

Picking Gooseberries Pick just before they begin to ripen, while yet green. On account of the strong and tart taste, they are very desirable for canning, pies and jelly. They also make one of the finest and most palatable catsups of any fruit grown; if this is new to you, try it and you will be surprised. When the fruit is left to ripen on the bushes, the berries are very sweet and delicious, and there is occasionally a demand for ripe berries; it always is well to find out from the merchant who handles your gooseberries whether he wishes them green or ripe. To clean gooseberries after being gathered, run them through a fanning mill, with cloth over the sieves. Gooseberries may be shipped long distances.

Points to Consider

in Planting Nursery Stock

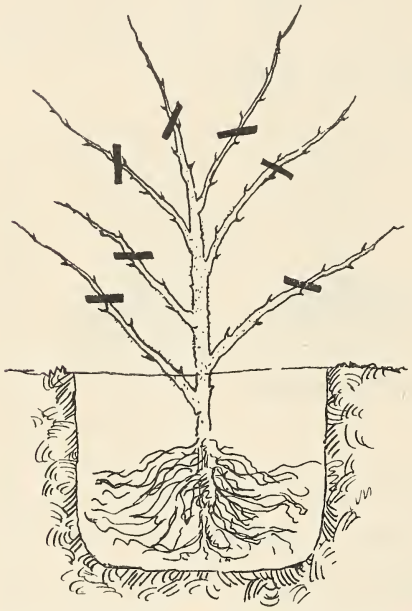
Dig holes large enough to contain all roots without crowding. See that roots are in their natural position. Do not crowd them together. Use only good, fertile top-soil about the roots -- tamp the soil about them firmly -- leave no air spaces. Cover the surface about the newly planted stock with loose soil which acts as a mulch to prevent evaporation. Depth of planting depends upon the kind of stock. Fruit trees as illustrated on page 11; vines and small fruits as shown on pages 20, 21, 23 and 26.

Shrubs should be set at least two inches deeper than they stood in the nursery.

PICKING, SHIPPING AND MARKETING FRUITS

CHAPTER III.

Hints on Packing, Etc. Don't wait until the last moment before deciding what kind of package you are to use. It is poor economy to hire cheap, green and unreliable help for picking and packing. Never tolerate rough and reckless handling of packages containing fruit. Haul fruit in a spring wagon or truck. Ship directly after picking, as every moment's delay decreases the value of fruits. Stamp your name and address on every package; mark on the outside of every package the variety contained. Avoid shipping soft fruits, such as berries, so as to reach the market on Saturday evening or Sunday morning. Remember that good choice fruit, well handled, properly graded, and neatly put up will always sell at good prices. Aim to grow such fruit, and then put it up in good shape. Ship in refrigerator cars if it is possible to obtain them, all kinds of small fruit, including peaches, plums and cherries, especially for distant points. Fruit dealers are not fools, and it is a difficult matter to deceive them by dishonest packing. Establish for yourself a reputation for good honest grading and packing. Secure strong and neat packages of full measure; don't try to pass off a short measure for a full one. In very warm weather, cut holes in tight packages in which you are shipping fruit, for circulation of air. Pack honestly, pick carefully;



Gooseberries—Planting and pruning.

Gooseberries—Second year, no pruning.

Gooseberries—Third year, showing system of spring pruning.

make three grades, sort out bruised fruit, and never mix windfalls with hand-picked. All fruits should be hand-picked and handled to avoid bruising. Windfalls should be marked on the outside of the package as such. When packing in barrels, kegs or boxes, shake gently when half full and repeat when nearly full to settle the fruit. Don't crush the fruit in barrels or boxes. All soft fruit such as berries, ship by express.

Hints on Marketing The subject of marketing is one of great importance. Many who are successful in growing fruit for market often fail in marketing their products. Few realize the importance of looking up a market before shipping time. If you have a good home market you should make the proper use of it and deal honestly with your patrons, thereby creating a demand for your products. If you depend on shipping your fruit, find a well known and established house in whom you can place your confidence and give them all the business you can. Don't overlook the value of a home market, if you have one, and don't refuse a reasonably fair cash offer for fruit in the orchard. Be cautious in shipping to unknown parties. Treat with mistrust letters of alluring and tempting character. Try to keep posted on the market.

Apple Hints Gather when fruit is matured but firm, before they drop or are blown off by the wind. Use good judgment as to the right time to gather. If picked too soon, poor flavor and wilting of the fruit will be the result; if left on the tree too long, they will drop off and cause loss.

Picking Apples The time to pick apples and pears is when their seeds have turned brown, when their flavor is recognizable, when the stem of the fruit separates easily from the fruit spur, and if the apple is a red variety, when its red is at its best.

Before picking time provide yourself with a suitable ladder and a picking bag. A very convenient picking bag can be made by taking a common clean grain bag and placing a stick about a foot long sharpened at each end so as to prop the mouth open, leaving a triangular opening, for the reception of the fruit as fast as picked by both hands. Tie the upper and lower corner together by placing a stone or apple in the lower corner so as to form a knob, then tie the bag strings closely above it. It is then slung over the shoulder as shown in illustration. A piece of stiff leather buttoned on the shoulder will serve to protect it from the weight of the bag. For tender-skinned varieties picking baskets are preferred.

Apple Picking bag. See description under "Picking Apples."

In picking, apples and pears should not be pulled off; lift the apple slightly and with a quick turn of the wrist it will come off without injuring either the stem or the fruit spur. The apples when picked should be carefully laid in the bag, not dropped in. When the bag is filled it is placed in the bottom of the barrel or basket and emptied by carefully withdrawing the bag and allowing the apples to slide out without danger of bruising—not dumped out.

Place the fruit in barrels or boxes, before grading put them in a cool, dry place, and let them remain open, standing on end, until ready for shipment; then empty carefully on straw, hay or blankets, re-sort and pack all sound fruit in barrels or boxes. Another method is to put them under cover in a shed or barn until there is danger of freezing, when they should be barreled up or put on shelves in a cool cellar. Mark the variety and grade on the end intended for the head of each package. Use windfalls and culls for drying, cider, jelly or vinegar.

For fancy trade, select the choicest fruit, wrap in paper and pack in bushel boxes. An attractive label will enhance the value of the package.

Picking Pears Gather while yet firm, when matured. Early varieties soften quicker than late, and require quicker handling. Strong crates, either half or full bushel, are best for shipping pears. Make two grades, and don't ship culls. Plant the best varieties, such as Bosc, Clairgeau and Bartlett, varieties that are always in good demand. Ripen late fall and winter pears in a dark cellar.

Picking Plums Plums are classed with soft fruits and must be handled accordingly. Pick before getting soft. Use a strong, stiff Climax basket, either one-fifth or one-quarter bushel. If shipped in large baskets, they rarely ever reach their destination in good condition. Fancy or large fruit should be wrapped in tissue paper and shipped in shallow baskets. Unless you have through freight lines, affording direct and quick transportation, we advise shipping by express.

Picking Peaches Exercise the greatest care in picking peaches so as not to bruise the fruit. The proper time to pick peaches depends upon whether you are picking for distant market, local market, or home use. If for distant market, pick when fruit begins to get its characteristic color, when still firm; for local market, begin picking a few days later, and for home use, when ripe, before too soft for handling. Two pickings are necessary, the ripest first.

We wish that we were able to put it down in words strong enough so that it would be fully understood by growers of peaches, how important it is that the grading and packing be done straight and carefully. The fruit should average evenly throughout the package in size and quality. Many growers curse the commission merchant, when they are often to blame. Few realize that failures in fruit growing are often the result of dishonest and careless packing. Grade carefully every package, make two or three grades. Bring under shelter and sort from benches or use a peach grader. In packing shake the package very gently from time to time until filled. Mark each grade on the outside of package. Sell or ship immediately after packing. Haul with spring wagon or soft spring truck. Don't ship decayed or soft fruit, it will spoil the sale of good fruit. Consult dealers and shippers as to kind and size of package to use. Cover fruit with blanket or canvass cover to keep off dust and sun while hauling it. Sell all you can at home and ship the balance.

Picking Cherries Pick with stems before fruit is too ripe. Deliver or ship the same day when picked if possible. Use 16-quart crates for shipping. For the large sweet varieties of cherries, good prices may be obtained if packed in quart boxes crated.

Picking Quinces Pick when ripe; handle carefully, as every bruise will turn brown. Ship in bushel or half bushel.

Picking Grapes Gather when fully colored and sweet. Too many grapes are picked too green. Unripe grapes are injurious to health, and are relished by no one. While picking handle very carefully, lay them gently into the basket. Use a strong stiff eight or ten pound basket. Two pickings should be made, as those most exposed to the sun will ripen first. Use a spring wagon for hauling. Grapes may be kept for a considerable length of time after picking, even into the winter, if handled with care to prevent cracking, if kept in a cool dry cellar or storage, in an even temperature.

Picking Currants Pick when fully ripe, and ship either in one quart boxes crated or half-bushel shallow crates.

Where to Buy Fruit Shipping Packages Congress recently has passed a law standardizing the size of fruit packages. We give below a list of reliable firms who manufacture fruit and vegetable packages to be used for marketing purposes. These firms have made such changes in the size of packages necessary to meet the requirements of the law. Parties writing for catalogs to these firms will receive special attention and attractive prices if they will mention our name.

The Pierce-Williams Company, South Haven, Mich.
Higman Package Co., Benton Harbor, Mich.
Thayer & Co., Benton Harbor, Mich.
E. E. Weed & Co., Douglas, Mich.
Shelby Basket Co., Shelby, Mich.
Harrison Basket Co., Shelby, Mich.
J. H. Loomis, Ludington, Mich.
Wells-Higman Co., Traverse City, Mich.

Best Kind of Packages for Fruit Marketing Products

For winter apples—bushel boxes, baskets or barrels.
For early apples—bushel baskets.
For peaches (fancy stock)—bushel baskets.
For peaches (early, soft varieties)—1-5 bushel Climax baskets.

For plums—bushel baskets or 16-quart crates.

For pears—1½-bushel baskets or bushel baskets.

For cherries—quart boxes in crates or 16-quart crates.

For berries—quart boxes in 16-quart crates.

Note—many states have laws standardizing the grades of apples and peaches shipped to markets. Confer with Agricultural Colleges for information on this subject.

Twenty-five bushels of Peaches picked from five 5-year-old Greening Strain of Trees. Note the uniformity of size. Peaches like these invariably bring $2.00 per bushel at any fruit market.

A well cultivated orchard, sprayed and cared for as instructed in this booklet, will always be a profitable investment.

PRACTICAL SUGGESTIONS ON THE PLANTING AND PRUNING OF ORNAMENTAL TREES, SHRUBS, EVERGREENS, ROSES, PERENNIALS, ETC.

CHAPTER IV.

We sometimes feel that the "hurly burly" of modern business destroys man's appreciation of the beautiful in nature—the ennobling effect of trees, plants and flowers on the morale of mankind.

To quote Lord Bacon "men come to build stately sooner than to garden finely, as if gardening were the greater art." How common it is to see a large house without any effort made to beautify or give it a natural setting. In the absence of trees and vines and flowers and flowering shrubbery the house is but a house, bleak and bare! And yet this house may be softened by vines and the right selection and proper planting of shrubbery and trees.

American Elm

It would seem, that the owners have overlooked the fact that thousands of people pass their place daily to one that enters it! Thousands of dollars are spent for interior decoration to one that is invested in nature's furnishings, namely, trees, shrubbery, vines and flowers!

What a contrast between a house that stands bleak and bare—without lawn—without trees—without shrubbery—without flowers! On the other hand, be it ever so humble, a cottage that is surrounded by nature's carpet—the lawn—well placed and selected trees, well selected and rightly planted shrubbery and flowers and vines is truly a home, and attracts the attention of every passer-by.

The value of the property is increased, and in the north temperate zone where we practically live outdoors nearly six months of the year, it is as fully important that the home be furnished outside in the right manner as it is that the interior of the home be given costly furniture and interior decoration. Trees, shrubbery, plants and flowers appreciate from the moment they are planted—the house decorations and furnishings deteriorate from the moment they are finished and put into use.

The American parent should consider also the beneficent effect of nature on the young generation, and an effort should be made to bring nature near the home life. The memory of a home, rightly planted, is never effaced from those who may have to leave and fight the battle of life.

And this is true, not only of the homes in cities and towns, but also on the farm. How common it is in driving thru the country to see a beautifully kept orchard; a stock farm in perfect condition or a general farm that is the pride of the countryside, well kept in every respect, a model of neatness and perfection and yet find in the small lot about the house nothing to beautify, no attempt made to soften the exterior, or the harsh lines of architecture, or to screen undesirable views, so that each day of the year the inmates may have something pleasing to look upon!

The owners of these homes that are not beautified should remember that they are not on the farm merely for the dollars to be dug from the soil, but are there to live and enjoy all the benefits of nature. It is really necessary to do this to keep in step with the advance in civilization—to be in keeping with the type of business you are doing—to keep your home representative of your aspirations—your life!

This book is written for the purpose of giving you information on how to take care of living plants, that they may succeed best, and with this book as a guide any layman can make a success of fruit growing and have beautiful flowers.

Many is the man who goes home tired of an evening from his work in mill or shop, office or store, who can add years to his life by devoting an hour or so each day in caring for his trees and plants and flowers about the home, and in making his backyard as beautiful as his front yard. This is easily possible if the "will" to do is in him. The benefit derived from this exercise is healthful and stimulating to mental activity. It will keep him out of the slough of despond, or the rut into which so many men are apt to get, and if for no other reason, every home owner should plant his place, so that he may give it the loving care necessary to success with his own hands, because the enjoyment derived will be ten-fold greater than if it was left to others who work for mere pay.

Lawns The lawn is the "carpet" of the yard—the trees and the shrubs and the flowers are God's furniture given us for outside embellishment. It was Walt Whitman, the good Gray Poet, who said that he "guessed the lawn was the handkerchief of the Lord, a scented gift and remembrance designedly dropt".

The lawn is the one permanent feature of the home grounds and should be equally attractive from all points of view, at all times of the year, and all succeeding seasons. A perfect lawn is the greatest achievement of the landscape gardener's art, and volumes have been written on how to secure it. But this is a question of place or location, and needs the saving grace of common sense applied to local conditions of the soil and climate.

The first step is to spade eight inches deep, and if the soil is not good it must be made so. If, in excavating, the subsoil has been dumped promiscuously about the place, it must be removed. If the soil is not naturally good, it should be made so by covering the entire lawn with not less than three inches of soil that is fertile.

The grading is largely a matter of taste and location and when finished should be raked over and over again until there are no stones, sticks or any other impediments which will interfere when mowing begins. After grading, it should be covered with not less than one inch of well-rotted manure and this will be well mixed with the soil after the absolutely necessary rakings which must be given to secure freedom from anything foreign which would later interfere with the mower.

When the necessary smoothness and texture are secured by the rakings it must be seeded and for this operation a still day is essential. The seed should be adapted to soil and climate and there are many varieties of grasses to choose from.

In most soils north of the Ohio River, Kentucky Blue Grass is the general favorite, but this grass will not thrive nor thicken on sandy soils, it being especially adaptable

to the limestone soils. Canada Blue Grass is useful on dry and clayey soils, and is a good drouth resister. Many of the Fescues are valuable. The Hard Fescues form a dense mat and stand drouth well. The Sheep's and the Creeping Fescues are also useful in mixtures.

Sweet Vernal Grass gives a softness to the lawn. Wood Meadow Grass succeeds well in the shade. Good mixtures utilize the top soil and if bought from reputable seedsmen will be satisfactory. If you will tell them your soil conditions, they can give you the proper mixture for your location, but do not use "cheap" mixtures. Your lawn will last for all time, if care is used in its preparation and the proper attention given it afterwards.

Just before seeding, the lawn should be lightly rolled. Immediately after, it should be raked in two different directions and rolled thoroughly. This will compact the soil so that the seed comes in contact with the soil particles.

If water is available sprinkle thoroughly and often with a fine spray, not with force. If no water, a day can be chosen before a rain to sow the seed.

The lawn should be seeded as soon as the soil warms slightly, last of March or early April in the north. Use one-quarter of a pound for 300 square feet or five bushels to the acre.

Aside from well-rotted manure, the best fertilizer is bone-meal. Pulverized sheep manure, which may be had from all seedsmen is also good, sown broadcast in early spring. The lawn should be rolled each spring as soon as the freezing nights are past.

Defer mowing until the young grass is about three inches tall. Do not cut too closely, but regularly. This will induce the grass to spread. If cut weekly, the clippings should not be removed. They protect the roots against the sun and furnish a mulch.

Photos B and C shown above are good examples of what a lawn should be.

A beautiful home with lawn trees and shrubbery properly designed and planted.

Trees A tree is a wonderful living thing, developing into beauty, and value year after year for many generations. Whether standing in the field, park, garden, roadside or forest with their majestic branches, pointing heavenward, they represent wonderful character in nature's grandeur.

Trees and shrubs are the natural framework—the setting of every landscape picture. With trees and shrubs we emphasize certain natural things on the earth's contour, screen unsightly views and give the sky-line a most interesting outline, and it is possible by careful and judicious planting to give even a small piece of property an extensive appearance. Trees not only add to the beauty of the surroundings, but also offer their cooling and refreshing shade during the hot summer months.

Plant the Right Varieties The planting of the right varieties for harmonious combination and for adaptability and hardiness requires considerable knowledge of tree life. Mistakes often are made in selecting varieties that are not suitable or adapted for the purpose sought. It is therefore, advisable to consult someone of experience and knowledge. A tree is planted for generations to come and care should be exercised in selecting the right varieties. Soil conditions, environments and elevations are items to be considered. In heavy soil, thrifty, deep-rooting varieties should be planted in preference to others. In wet places only such varieties of trees should be planted as will thrive best under wet conditions. And you must not forget that trees and shrubs vary greatly in character, size and growth.

Planting of Ornamental Trees and Shrubbery In most instances trees and shrubbery are planted for their general effect rather than for their flowers. The blooming period of most shrubs is short, but the foliage is interesting all season and plans should be made to maintain the stock in its normal health of growth. This calls for soil conditions which will give the results desired.

In building a lawn the grounds about the house receive the excavated soil from foundation, which is graded and then perhaps a few inches of good soil placed on top to secure a stand of grass for the lawn. Directions are given for the making of lawns on page 31, but when planting trees and shrubbery about the house the practice is too often followed of simply digging a small hole, crowding in the roots, which results in stunted growth that can never be remedied by later cultivation or fertilization.

Preparation for Planting Trees and shrubbery are living things and get their food for growth from the soil. It is necessary then to provide good, friable, loamy top soil and an adequate supply of well-rotted manure to secure the best results. All beds for shrubbery should be dug at least twelve inches deep and the holes made of ample width and depth when planting trees. The holes for trees should never be less than one foot larger in diameter than their roots—the roots should never be cut off to accommodate the hole.

Depth for Transplanting In general, all nursery stock should be set one or two inches deeper than it stood in the nursery and when finished the soil about the plant or tree should not be hilled up, but a basin-like depression should be left around the stem or trunk which will catch the rainfall, so that it may be held until it soaks down to the roots.

Distances for Planting Shrubbery The distance apart for planting shrubbery may be briefly stated thus: Low growing shrubs 2½ feet apart; medium growing 3 to 4 feet, and large growing 4 to 5 feet apart.

The distance for planting shrubs on small grounds such as city lots, home surroundings, library and public grounds should be from 2 feet for the dwarf varieties to 3 and 4 feet for the medium and tall-growing shrubs. Close planting has a tendency to dwarf or check the growth of a shrub. Often a dwarf variety of shrub is intended to serve as a banking between a walk and house where the space is but 2 feet or less, in which case Berberis Thunbergii and Deutzia Gracilis may be planted as close as 15 inches apart, cutting back the top one-half at planting time. This severe disciplinary training reduces the sap pressure and results in checking or dwarfing the growth. For a very low dwarf shrub hedge Berberis Thunbergii may be planted as close as 12 inches apart.

Fertilizing Trees and Shrubbery Fertilizers or manure should never be placed in direct contact with the roots. Well-rotted manure of horses, cows, poultry or sheep may be thoroughly incorporated with the friable top soil when planting, which will feed the newly planted stock as soon as growth begins. Later, bone-meal can be cultivated in around the plant, or nitrate of soda, or sulphate of ammonia used in small quantities each spring if the plant is not making normal growth.

Tamping and Watering When planting the best soil should be selected to put around the roots. This should be firmed, or tamped, leaving no air spaces. If water is available and the ground very dry a small quantity placed in hole and then filled with soil will compact the same and provide the necessary moisture.

Pruning the Newly Set Stock All bruised or broken roots must be carefully pruned with a clean cut when setting. It is best to make a sloping cut from underneath. All branches which interfere with each other or are dead or bruised should be removed also at this time.

Spraying Shrubs For insects that eat the foliage, spray with three pounds of Arsenate of Lead to fifty gallons of water. For Green Aphis (so-called green lice) and other sucking insects feeding on the tender tops of Spirea Van Houttei, Roses, etc., use Tobacco, one pound; water, two gallons. Place tobacco in hot water, bring to a boil, keep solution hot—not quite boiling——for one hour. When cooled, either spray or place in a pan and dip the affected branches. Another very effective remedy for Green Aphis is Black Leaf 40 (Nicotine) manufactured by the Tobacco Products Company, Louisville, Kentucky, to be used at the rate of 1 part of Black Leaf, 40 to 800 parts of water, adding 2 pounds of whale oil soap to 50 gallons of water to make it stick better. For scale insects use Lime Sulphur solution manufactured by Rex Spray Company, Toledo, Ohio, one part to eight parts of water. Spray in March or early April.

Hedges A fence or barrier of living green is much more beautiful than one built of any material, such as stone or wood, iron or wire. The living hedge has the warmth of life, and if the variety planted is properly selected, is both interesting and effective the entire year thru all its changing seasons.

For whatever purpose it is designed a certain type of plant may be secured which will be found satisfactory. Care must be used in selecting the right plant for different purposes. Screens or barriers must be compact and close growing. In planting, as much care should be used as when setting shrubs in borders and other ornamental plantings. If the soil is not rich, mellow and friable it should be made so. The excavation should be proper for the root system of the plant used and the poor soil removed and good soil secured for the excavation.

Hedges may be set in single row or staggered as may please the owner and best suit the purpose desired. The distance apart for normal planting is 12 inches. When staggered thus:

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ten inches apart alternating as shown. This distance for the privets and barberry. Larger growing plants should be set farther apart. No one rule will govern all varieties of plants.

Some of our Evergreens. We have one of the largest stocks in the country. A visit to the Nursery will convince you.

Practical Suggestions for Transplanting and Care of Evergreens

The best season for transplanting Evergreens is in the spring, but not before the soil is sufficiently warm to permit root growth. They can also be readily transplanted in early fall, say two or three weeks before they become dormant. Bear in mind that fresh stable manure is fatal to Evergreens and never should be used. If used at all, use well-rotted only and then preferably as a mulch.

Because of high winds evergreens should be guyed until they are established. This is particularly true of the larger sizes.

When evergreens are received they should be immediately placed under shelter protected from the wind and sun and wetted down. Don't delay planting. Dig the hole at least one-third larger than the ball of the roots and a little wider at the bottom than at the top. Dig the hole deep enough so that the tree will stand, when planted, two inches deeper than it stood in the nursery. In heavy, hard soils, it is well to dig the hole deeper than required and fill the loose soil to the level required for planting the tree. Place the tree in the hole, remove the burlap, fill in with loose soil, tamp firmly and carefully with a wooden tamper or the foot, so that all the air spaces will be filled in.

Always leave a slight depression of the ground around the tree so that water may settle down to the roots. After planting, place a mulch of manure two or three inches thick over the top to hold moisture. Evergreens after planting the first season require more water than other trees and should, therefore, receive a thorough soaking of water at least once a week during dry seasons. The proper time to apply water is in the evening at sunset. If trees are planted in sod, leave a space three feet clear of sod.

Vines Do not place vines too close to the foundation walls. Excavate to a depth of at least one foot and use the best of friable top soil around the roots. Should the over-hang of eaves hinder the vines from getting the proper amount of rainfall they should be watered regularly in dry seasons of an evening and the soil about the plant cultivated the next day. As a rule vines, or climbers on the walls should be set 12 feet apart and on embankments 3½ feet apart.

Perennials The bed into which perennials are to be planted should receive attention sometime before they are set. If the soil is not naturally fertile it must be made so. Care must be taken to set neither too deep nor too shallow.

A fine mulch on the perennial bed will prevent losing the moisture. If unable to obtain well-rotted manure, the bed must be kept carefully cultivated all summer and then mulch in late fall with strawy manure after the ground freezes. The coarser

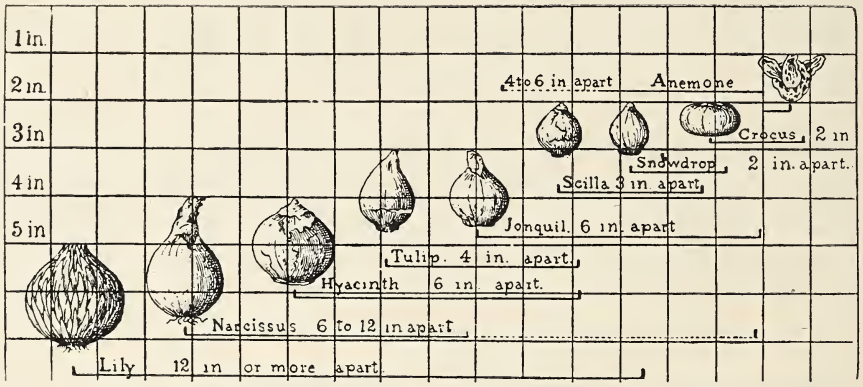
parts of this manure may be removed the spring following, digging in the finer parts left, but not digging deeper than three inches, or the roots of the perennials may be injured.

The one best fertilizer for Peonies and Japanese Iris is cow-manure, if unobtainable, the only fertilizer which is safe to use for all perennials is bone-meal.

In dry seasons they must be watered. Once every week will answer, if given a good soaking in the evening, providing they are cultivated the next day. All dead flowers and seed stems must be removed.

Perennials are hardy and free from disease. Aphis may be controlled by spraying. Should any plants appear diseased they should be removed and be thrown away, both root and branch.

Distance Apart to Plant Perennials The distance apart for planting herbaceous perennials cannot be specifically stated and only general rules are given. Edgings such as the Harebell should be planted 6 inches apart. The low-growing kinds 12 inches apart; medium-growing kinds 15 inches apart; tall-growing kinds 18 inches apart. Peonies which are spreading should be planted 3 feet apart.



To illustrate depth and distance apart in planting bulbs.

Hardy and Tender Bulbs The Bulb is a dormant plant, and there are two kinds—those that are hardy and may be planted in the fall to flower the summer following, and tender plants such as Cannas, Dahlias and Gladiolas, which are planted in the Spring and will produce flowers the same season.

Hardy or fall bulbs should be planted in September or October. Tulips, however, may be planted as late as November.

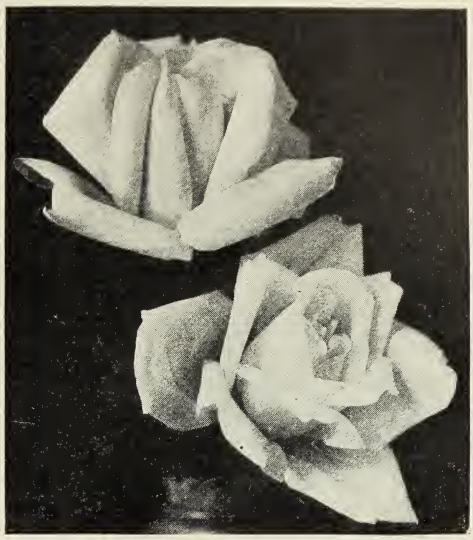
Plant only in well-drained, rich soil. Good drainage is essential and must be provided, if not natural.

Never use fresh manure in the bulb bed. Well-rotted manure may be incorporated in the bed, but must never touch the bulbs. It is best not to use it at all, depending on bone-meal for fertilization.

If uniformity of bloom is desired the bulbs must be planted at the same depth. As a general rule they should be planted, three times deeper than their average diameter. (See cut showing depth to plant various bulbs on this page). In planting be careful to leave no air spaces below the bulb. Set firmly. Mulch the bed of fall planted bulbs as soon as it freezes at the approach of winter. Straw or leaves from 4 to 6 inches in depth will answer. Remove in early spring after danger from freezing is over.

The distances apart for planting Bulbs and Tubers are as follows: Hyacinths, Tulips, Narcissus and Anemones, 6 inches; Crocus, 3 inches; Squills, 4 inches; Snow-Drops, 2 inches; Lilies, 18 inches. Of the tender bulbs, Gladiolas should be planted 4 inches apart and the Dahlias 3 feet.

Roses Roses thrive best in a heavy clay loam, enriched with well-rotted cow-manure. Sand and finely pulverized limestone may be added to the average clay loam with benefit to the plant. Except for Tea Roses, lighter soils should be avoided as much as possible. All of the Teas do better in ground moderately heavy. Great care must be exercised in the preparation of the soil and perfect drainage provided. The rose bed should be excavated from 2 to 2½ feet deep and the lower 6 inches filled with pieces of rock or broken brick. About a foot of cow-manure should be spread over the broken rock or brick and the excavation filled with heavy clay loam of sufficient depth to keep the surface when settled slightly lower immediately to give the plants a better than the surrounding level. Most soils require some form of lime for correcting the acidity. If there is a greater portion of clay than loam in the soil a little sheep manure, dried blood, or any other quick-acting chemical fertilizer will provide available plant food start.



LADY HILLINGDON

Refer to our Catalog page 133

Planting Roses Dormant roses may be set out either in fall or spring, using preferably two year old plants. They should be set in the ground at least 3 inches deeper than they originally grew, and if planted in the fall, earth should be drawn up around the stem and the ground mulched with any convenient material suitable for the purpose, such as well-rotted manure, leaves, straw, or the like. After planting all roses should be pruned back to four inches of the ground.

Distance Apart to Plant Roses In planting, all broken roots should be removed and the top cut back to 3 or 4 buds. A serious mistake is often made in planting Roses too close. A general rule to follow is that bush Roses should be planted 2½ feet apart, Hybrid Teas 2 feet, Polyantha's or Baby Ramblers 12 inches, Climbers on trellis or porch 4 feet apart, Climbers on fences 10 to 15 feet apart, Climbers on embankments 3 to 4 feet apart.

Pruning Roses Roses should be pruned in a dormant season, preferably in the early spring. The severity of the preceding winter often governs the amount of pruning, especially with Teas. Plants are sometime frozen to the ground, unless winter protection is given, when it is necessary to remove practically all of the top.

When the sap begins to flow the Hybrid Perpetuals and other hardy roses may be pruned. Memorial Roses and Ramblers should be pruned just after the flowering season to produce wood for next year's bloom. As a general rule, severe pruning will produce the largest and best flowers. A more moderate pruning will insure a larger crop of average flowers, and medium pruning a large crop of smaller blooms.

Severe pruning means that the plants should be thinned out to the base, leaving only 3 to 5 shoots with two or three buds on each shoot. Moderate pruning requires the same number of shoots, except that from 5 to 10 buds are left. For medium pruning leave 4 to 7 shoots, cutting each back to one-half its height.

The stem should always be cut from one-fourth to one-half inch immediately above a strong bud that points out from the center of the plant. In pruning, the plant should be left with a well-balanced appearance with an uncrowded center. Seeds should never be permitted to ripen on rose bushes as this will weaken the plant.

Hybrid Perpetuals should be cut back to six buds on strong canes, the top bud pointing outward.

Hybrid Teas and the Tea Roses must be cut to the surface of the soil if necessary to get to live wood. Do not cut back so severely, however, unless it is necessary.

Rugosas, Austrian Briars, Ramblers and Wichurianas need but little pruning. Thin out and cut back only a few inches.

Climbing and Pillar Roses should have one-third to one-fifth removed, removing old wood once in three years.

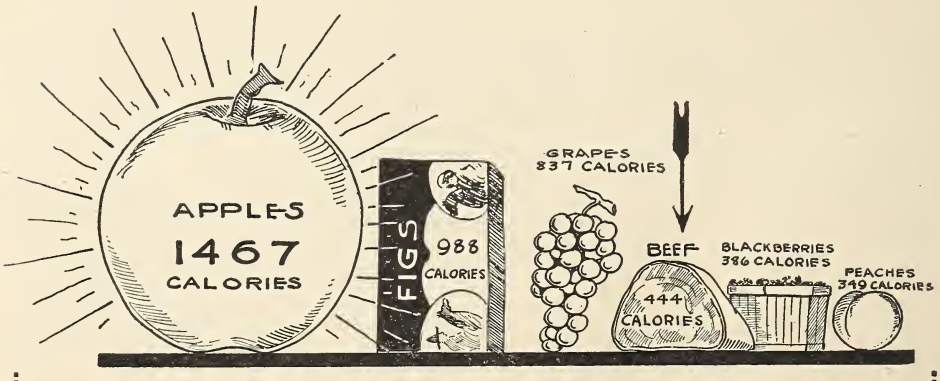
Care of Roses The surface should be cultivated a few times, and then the ground given a thorough mulch, preferably of rotten manure. It is true that Roses thrive best in the sun, but they like "cold feet", and if great beauty of bloom is desired this mulch must not be neglected, as it is the most important preparation in making a success of Roses. This mulch should be continued each year, cultivating the ground thoroughly before its annual application. All suckers growing up from the wild root should be removed as soon as seen close to the stem. If when cutting roses only one bud is left on the stem finer and larger blooms will follow.

Winter Protection of Roses The best winter protection for all Roses, except Climbers, is to hill them up to a height of 6 or 8 inches, drawing the soil around the plant up close to it to the height named, then covering with leaves placing thereon corn-stalks or brush to prevent the leaves being blown away. In the spring when all danger of freezing is past this covering can be removed and the soil leveled gradually to harden off the plants. Climbing Roses if loosened from the trellis can be laid down during the winter months covering with soil, leaves or corn-stalks.

Spraying Roses for Insects For Green Aphis (plant lice) use tobacco 1 pound, water 2 gallons. Place tobacco in hot water, bring to a boil, keep solution hot—not quite boiling—for one hour. When cold, spray or place in a pan and dip the tops of the branches affected by the insect into the solution for 30 seconds.

Another very effective remedy for Green Aphis is Black Leaf 40, manufactured by Tobacco Products Company, Louisville, Ky. Use at the rate of 1 part of Black Leaf 40 to 800 parts of water, adding, if convenient, 2 pounds of soap to 50 gallons of water to make it stick.

For worms and rose beetles spray with 3 pounds of Arsenate of Lead to 50 gallons of water; or Paris Green, one-half ounce to 5 gallons of water.



The value of fruits as food has been very much underestimated. Figures taken from Farmers' Bulletin No. 293, showing the amount of heat and energy units that can be purchased for 10 cents in various kinds of fruits as compared with porterhouse steak are given below:

Porterhouse Steak	444
Apples	1,467
Grapes	837
Peaches	349
Blackberries	386
Figs, Dried	988

This shows that we are getting good value for our money when we buy fruit as food, but its greatest value is not in the amount of energy, but in the tonic or stimulating effect that it possesses.

THE PRINCIPLES AND PRACTICE OF PRUNING ORNAMENTAL STOCK

CHAPTER V.

Unless there is a very good reason for it the best rule to follow is not prune at all, and in each and every instance, it is best to stop and think before attempting to use either knife or shears.

Wisconsin Weeping Willow

Most of us are lovers of nature, and this is the reason we surround ourselves with trees, shrubs, flowers and growing plants. Why should we persuade ourselves that we can improve on the natural beauty and grace of shrubs by pruning them. We should remember that each variety of shrub has its own individuality as to form and manner of growth.

Sometimes the expert has reasons for pruning to produce a formal effect. Now and then, the removal of dead wood or where shrubs are encroaching on walks, drives, etc., should be pruned. If large branches are causing trouble they should be cut back to the ground, or better still, remove the plant entirely and substitute a dwarf growing variety of some sort.

A shrub closely sheared has lost its identity—its natural form and grace. If pruned without reason it can only be classed as a mongrel.

All shrubs closely pruned will develop a broom-like growth in most instances, which is very unsightly.

Mass plantings, comprising groupings or boundaries should be left to grow naturally. To be natural, outer branches should gracefully droop and meet the lawn.

Soft, natural, landscape efforts cannot be produced by shrubs pruned to the extent that they appear "lanky or leggy", therefore, the safest rule to follow in this case is to let nature do its own pruning by her own method of the "survival of the fittest". Confine your operations to the cutting out of dead wood in order to maintain a natural effect, with the exceptions noted below.

There are certain varieties of shrubs such as Hydrangea Paniculata Grandiflora—the Althea or Hibiscus, commonly called Rose of Sharon, and Bush Roses, which should be cut back severely early in the spring before growth starts. The reason for pruning these varieties is to force strength into the flower, but these varieties are not in the same category as those intended or used for landscape or natural effect, they should be set apart from the rest of the planting, so as not to break the harmony of outline.

One other good reason for pruning is for formal effect and hedges. This is for a strictly formal planting or in formal gardens. In this case, care must be exercised in selecting the proper kind of shrubs to get the desired results. Some shrubs more readily adapt themselves to this sort of treatment than others. In such cases they should be sheared at regular intervals, or when the specimen begins to appear ragged. A few of such varieties are as follows: Berberis Thunbergii, Philadelphia Aureas, Ribes, Spirea Thunbergii, Spirea Van Houttei, Privets, Philadelphia Lemoineii, Lilacs, Tamarix, Cratageus and Malus.

If you still feel that you have to prune—must prune—and have no desire to retain the natural beauty of the shrub, there is another rule you can follow:

Prune spring flowering shrubs, including those flowering up to the last of June immediately after flowering.

Prune fall flowering shrubs, preferably early in spring before growth starts, leaving the shrubs looking as natural as possible.

Diervilla Candida (Weigela)

Do not try to prove yourself a "tonsorial artist"—reserve this for the primary planting only.

Removing the seed pods of the spring blooming varieties will invariably give more abundant bloom the following season. The removal of these seed pods should be done before seeds begin to form, for if the pods reach maturity it reduces vitality of the plant. All that is really necessary is to pinch off the pods. Spirea, Anthony Waterer and other Spireas of this type, Lilacs and Diervilla (Weigelias).

PRUNING SHRUBS BEFORE PLANTING

It is customary with some planters to cut back or prune shrubs severely when transplanting. This, however, is not necesesary if the shrubs are young and vigorous and the root system is not mutilated, and the stock has not been subjected to careless handling, resulting in drying out and reducing its vitality.

PRUNING TREES AT THE TIME OF TRANSPLANTING

The principal operation at this time is to cut off all broken and interfering branches. Remove also a few of the inner branches, especially so if the tree has put on an abundant growth, preferably at the nearest fork. Follow down the branch that you wish to remove to a suitable fork so as to leave a branch at this junction to continue on and preserve the natural form of the tree. Chopping off the branches—leaving the stub ends is not the proper way, but simply "butchering".

If the tree is in good condition when received, that is, not dried out and has ample root system, it is not necessary to cut back the ordinary varieties of shade or lawn tree to any great extent. This rule does not apply to fruit trees. There are, however, a few exceptions to this rule, as for instance, the Tulip Tree and Magnolias. These will be benefitted by heading-in or cutting back severely.

Cut off all broken and bruised roots, making a clean cut. This is very necessary. New rootlets will start quickly at each of these cuts. If the ragged and bruised roots are allowed to remain it is a hard fight for the tree to form new roots and it retards it in its fight to readjust itself to its new environment.

TREE PRUNING AND TRIMMING

There must always be a reason or purpose for tree pruning. In some respects this depends on where the trees are located, or the purpose for which they were intended when planted—that is, whether for shade, as isolated specimens or for a back ground in a planting skyline or screen.

A Planting of Evergreens

For street planting prune to the height the City Ordinance requires. If no such Ordinance exists then high enough to clear a man carrying a raised umbrella.

Near a house or for shade trim to the height desired.

For a lawn or specimen planting, if there is ample room some varieties such as Purple Beach, the Thorns, Hornbeams, some of the Maples, including Norway and other varieties inclined to branch low, beautiful effects are secured by allowing the lower branches to sweep the lawn.

For background, skyline or screen they require no pruning, except the clearing out of dead wood.

The rule for pruning is to always make the cut close to the trunk, main branch or crotch. Do not leave a stub as it will not heal over but in time rot and cause injury to the tree. Make the cuts smooth and coat it with paint or pure asphaltum if the cut is over one inch in diameter. Follow the same rule when ridding the tree of dead wood.

If it is found necessary to thin out or trim the tree use great care not to disfigure or destroy its natural beauty. Either cut off the branch at the trunk of the tree or at a crotch or fork, leaving one of the branches (the one most suitable) to take the lead. Cut out all interfering branches such as branches crossing one another.

The expert's pride in cleaning out or trimming is to complete the job in such a manner that it is next to impossible for the observer to detect where any of the wood has been removed, even to the extent of a severe pruning.

A tree trimmed to globular, round top or conical form, is a monstrosity. Let the tree retain its natural grace and form. This can easily be done by using a little care and judgment. If a tree has been allowed to grow naturally without being overcrowded or disfigured by previous pruning it is next to impossible to improve its form.

THE BEST TIME TO PRUNE

The best time to prune is after the middle of June and from then on until it commences to get cold.

Some trees will stand trimming before this time. Others will not. To be on the safe side let this be your guide: Begin after the middle of June. Then again after the leaves have fallen and up to December and January, but it is not good practice to prune when trees are frozen.

Evergreens.

EVERGREENS

Evergreens require no pruning, except the removal of dead wood unless they are intended for formal effect, and it is desired to keep them within a certain limit or to retain the desired height or form.

In this case they require shearing at regular intervals and must not be neglected and allowed to put on a heavy growth beyond the bounds of the required form, as the extended branches become heavy and show a cut or stub-end in place of an even, uniform verdure. It is good practice to clip off the end of a branch which shows a tendency to grow beyond bounds as soon as it is noticeable.

A few of the Evergreens used for this purpose are as follows. For pyramidal effect: Thuja Occidentalis, Thuja Pyramidal, Juniperus Hibernica, Juniperus Chinensis Mascula, Juniperus Suecica, Juniperus Glauca, Thuja Occidentalis Aurea.

For round or globe shape: Thuja Globosa, Thuja Hoveyi, Thuja Occidentalis Ellwangeriana.

For conical effect: Thuja Siberica, Thuja Ellwangeriana.

Evergreens for lawn or specimen should not be pruned. Allow them to take on their natural growth—their lower branches sweeping the lawn. An Evergreen with its lower branches cut off is ruined. White Pine in time sheds its lower branches but takes on a very picturesque appearance if left to do its own pruning. When necessary to cut out dead wood cut close to the trunk, branch or fork.

If your tree is in bad condition and you prize it, call in the tree doctor or surgeon, but be sure that he is experienced and knows his business. It does not pay to trust such work to the hands of the amateur.

DISEASES AND INSECTS AND THEIR CONTROL

CHAPTER VI.

Nurserymen seem to be afraid to mention in their publications that fruit stocks are subject to disease and insects, just the same as every form of life is affected.

It would appear, they do not regard the American public intelligent enough to comprehend the great fact, that all forms of life are subject to disease, etc., even though everyone knows that each form of life has its enemies. But there are no more diseases or insects which prey on fruit than on wheat, or corn, oats or potatoes, beans, or cattle, hogs or poultry.

And too, diseases and insects which prey on fruits are more easily controlled than any other, if the spraying programs which we publish herein on pages 54 to 62 are followed.

The fruit grower should bear in mind that Sanitation is the best specific for diseases to which any form of life is subjected, and this should be the basic principle that controls its care and culture; either for orchard or small fruit plantations.

The old saying, "An ounce of prevention is worth a pound of cure" is particularly true in fruit growing, because it is really applicable, and must never be overlooked.

By using prevention, we are able to keep our nursery stock free from disease and insects, and we know that it is possible to do this. It simply requires that each operation should be looked forward to, prepared for, and done at the right time. The results achieved will gratify, and the profits derived from your fruit when marketed will more than please.

Fruit that is well-grown in a sanitary orchard will have high color; will be free from blemish, command the highest market prices and will command ready sale in any market, regardless of how glutted it may be with common and inferior fruit.

We are frank about this—we are telling you the truth. We believe that no man should enter into any business without considering the fight he will have to wage for success. And we are positive that a careful investigation of fruit growing will prove to any intelligent man that the profits of fruit growing are, on the average, greater than in any other business in which the land-owner can engage.

In this chapter there are many diseases and insects referred to which the growers may never have occasion to combat in their orchards. They are here given merely as a reference list.

The insects which injure fruit trees live by either biting off and swallowing a portion of the tender plants or by boring into the woody part just under the bark and girdling the tree. On the habits of feeding, the method of control is based.

Those known as the eating or biting insects may be controlled by entirely covering the plant with an Arsenate, while the sucking insects will require a solution like Whale Oil Soap which clogs their breathing pores or has a caustic effect upon their bodies.

Another general group of tree pests are the fungous or bacterial diseases. Fungous diseases are such as apple scab, brown rot of stone fruits, black rot of grapes, etc. These are controlled by fungicides.

The bacterial disease, such as Fire-Blight of the pear, cannot be controlled by spraying, but may be overcome by constant and thoro pruning of the burned or other affected parts.

It may be several years before any of these insects appear in an orchard or any disease is noticed, but it is absolutely essential to spray thoroly and not take any chances if you wish to market absolutely first class fruit and reap the resultant profit paid for same.

APPLE INSECTS

Aphis—These small insects commonly called lice are often found on young shoots of apple trees and are abundant in spring or early summer and in the fall. They may be found often on stems or the underside of the leaves; the latter being curled so that the pest is well protected from any applications that may be made. Unless it is very abundant it is not necessary to try to destroy them as they will not do any serious damage and in a short time will disappear. If it is necessary to destroy the lice on certain trees, a sufficient remedy will be found in tobacco water or in the decoction.

Borers—These can not be controlled by spraying, but the best treatment is to dig out the larvae or run a wire in to the burrow until the insects are reached.

Bud-Moth—These insects lay their eggs during June and July and hatch in about seven to ten days. They feed until about half grown or about six weeks and then form a silken case and conceal themselves in the crevices of the twigs. There they remain until the following spring, and then, when the buds begin to swell, the larvae again appear.

They are very small and dark brown, about one-half inch long and have a shining black head. They feed on opening buds and young foliage. They are quickly and easily destroyed by spraying and any grower following the spraying program given on page __ will have no trouble in controlling them.

Canker Worm—These are commonly known as measuring worms and are dark brown, yellowish or striped, about an inch long when mature. They go into the ground in late fall after leaving the tree, when the adult moths appear. The cheapest and best method of control is to spray early in the season with some arsenical spray given in the spraying programs outlined for apples in this book.

Codlin-Moth—This moth is about a half inch long of a grayish brown color. It begins to fly about the time the blossoms fall from the apple trees and continue for two or three weeks, laying their eggs in the blossom end of the little apples, as soon as the eggs hatch the larvae begins to eat the fruit. Spraying with arsenates is the best of any method of destroying this pest. Excellent results will be obtained by following the spraying program given for apples.

Curculio—This insect in laying its eggs cuts into the small apples and the egg is there deposited. This part of the apple grows more slowly and the injured part will soon become misshapen and should the fruit be stung several times it will be worthless because of its irregular form. Spraying with arsenates in early spring will control this pest and apple orchards that are thoroly sprayed by following a spraying program suffer but very little from this pest.

Fall Web Worm—The mature insect is white in color. It is widely known thruout the country and where no spraying is practiced causes considerable injury, but in a well sprayed orchard, there is little damage done by it.

Leaf Skeletonizer—The larvae of this moth can be detected by the curled and scorched appearance sometimes given apple leaves when young. It is about a half inch long and a web is generally spun with several leaves drawn together, making an unsightly object. If spraying is followed, very little trouble may be apprehended.

Oyster Shell Bark Louse—The best treatment for this pest which is a sucking insect, is to apply an insecticide which kills by contact, such as kerosene emulsion, or nicotine.

Tent Caterpillar—The moth of this pest lays its eggs close together in rows along the edge of small twigs in July. These eggs do not hatch until the following spring and the caterpillar feeds on the young leaves and when fully grown is about two inches long, somewhat hairy, having a white stripe down the back with yellow markings on sides, while underneath it is black. This insect does con-

DISEASES AND INSECTS, AND THEIR CONTROL (Continued)

siderable damage but is so easily destroyed that there is no reason for trouble. The nests should be cut off and burned but the best remedy is to spray the foliage with arsenates. The caterpillar returns to the web at night and will be found there in bad weather and if the tree has been sprayed they will return there to die. When spraying for the coddlin-moth enough poison will be used to kill the caterpillar also.

Woolly Aphis—This is a small, yellow plant louse found on many kinds of trees on branches and some of the roots. Because of its woolly covering which protects it, it is called Woolly Aphis. Kerosene Emulsion or Tobacco Water will kill it.

APRICOT

Fungous Diseases.

Leaf Rust—(See under Plum).

Insect Enemies.

Curculio—(See under Plum).

BLACKBERRIES

The insects and fungous diseases of this plant are treated under Raspberries.

CHERRY

Fungous Diseases.

Brown Rot—This disease and its treatment can be found under peach. Follow spraying program on page 59.

Leaf Blight—(See Plum).

Black Knot—(See Plum).

Insect Enemies.

Canker Worm—(See Apple).

Curculio—(See Plum).

Slug—The moth is a black fly having four wings. The eggs are laid in small openings made in the leaves by the insects. They hatch in two weeks and mature in four. They eat the soft tissues and leaves only. In some instances the leaves are entirely defoliated. There are two broods each year. Dry slaked lime dusted over the leaves will destroy the pest or air slaked lime will answer the same purpose.

CURRANTS

Fungous Diseases.

Rust, Leaf Spot—This disease appears a little before midseason and the first indication is a small, brown spot which causes the leaves to fall and in some instances the plant will be entirely bare of leaves before the end of the season. After harvest the currants may be sprayed with Bordeaux mixture.

Insect Enemies.

Currant Worm—The presence of this insect is often not noticed until one-third of the leaves have been destroyed. There is no insect which is more easily controlled. Plants should be thoroughly sprayed with arsenates as soon as the leaves—but this treatment should be made leaves unfold, but this treatment should be made early. If necessary, Hellibore will be found an effectual remedy whether applied dry or mixed with water.

Currant Leaf Hopper—These insects are true bugs. They suck the juices from the underside of the foliage causing the appearance of white areas on the upper surface which indicates the presence of the pest. Insecticides which kill by contact or Kerosene Emulsions may be used.

GOOSEBERRY

Fungous Diseases.

Mildew—This fungus attacks the foliage of young fruit soon after the buds have burst. The affected buds finally become dry and brown and the berries dry up and drop off before maturity, showing a powdery covering. The proper treatment is to apply fungicides. Bordeaux mixture may be used once or twice in the early part of the season, and the first application should be before the buds start in the spring.

Gooseberry Fruit Worm—This worm is about three-quarters of an inch in length, and feeds on the young fruit, causing it to ripen prematurely. Poultry often help in destroying the larvae before they pupate. It has been recommended to spray with sulphur and whale oil soap before the eggs are laid in early spring.

Other insects which attack the Gooseberry are mentioned under Currants.

GRAPE

Anthracnose—This is perhaps the most formidable disease with which the vineyardist must contend. The fungus attacks the green parts of the vines and it appears during the latter part of the growing season but most commonly affects the berries during the middle of the summer. The first indication of trouble is the darkening of a small area which extends lengthwise of the stem. This may be very abundant, giving the shoots a speckled appearance. The spots gradually enlarge and the center assumes a gray color, but the edge remains dark and is often tinged with purple. The stems are also injured and it frequently occurs that a part is completely girdled causing a "ring around"

DISEASES AND INSECTS, AND THEIR CONTROL (Continued)

as it is commonly called. The berries below the rings do not ripen but remain green and gradually shrivel.

The first indication of the presence of this fungus on the berries is the brown spots which are circular in outline. To prevent, the vineyard should be sprayed during the summer with Bordeaux mixture. Follow the spraying program on page 60.

Black Rot—There is probably no disease of the grape which causes greater losses than the black rot. It appears in July and September, at least that is when it is to be feared most. Altho it appears late in the season, it is well to begin early in treating the vines. The Bordeaux mixture is a specific against this disease. Follow the spraying program on page 60 to prevent.

Downy-Mildew, Brown Rot—This fungus attacks foliage, stems and fruits altho not so serious as the black rot probably causes more loss in the Northern States than black rot. Treatment should be preventative rather than curative. (See page 60).

Powdery Mildew—This is not a serious disease. There is little occasion to treat the vines unless the fungus has put in its appearance. Carbonate of copper destroys it and is easily applied.

Rattleshelling—It frequently occurs that grape vines drop their berries just as the latter are ripening. Remedial measures should be directed toward strengthening the plant which may need proper fertilization, potash often being one of the essential elements required.

Ripe Rot or Bitter Rot—The same treatment which serves to check black rot will also control this disease, the latter treatment being of especial importance. See page 60.

Grape Slug, Grape Saw Fly—This insect produces larvae which feeds in groups until the leaves are destroyed. They may be easily controlled by spraying with insecticides such as arsenates, hellebore and kerosene emulsion.

Grape Flea Beetle or Steely Bug—As soon as the buds of the grapes commence to swell in spring, this insect begins to feed on the center of the buds. As soon as the bud is eaten, it is, of course, useless and the entire crop may be ruined within a short time. The vines should be sprayed with Paris Green. Two applications in early season will practically clear the vineyard of this pest.

Leaf Hopper—This insect feeds upon the juices of the plant. The fallen foliage should be gathered and destroyed so that the insects will not find shelter during the winter. The remedy suggested for currant leaf hopper may well be used in a vineyard.

PEACH

Black Spot—This surface fungus is generally more severe upon the late varieties. As a rule, it may be prevented by following the spraying program outlined on page 57. The Bordeaux mixture is invariably used for this disease.

Brown Rot—This is the most severe fungous disease with which the peach grower is obliged to contend. Cherries and plums also suffer from this disease and in the same manner. The treatment discussed on page 57 is the latest and most authoritative for the control of this disease. Especial attention is called to an article by W. C. Dutton of the Michigan Experiment Station on the control of Brown Rot, taken from Michigan Experiment Station bulletin of recent date and which follows: "Brown rot has been a most frequent cause of serious losses to growers of peaches, plums and cherries at harvesting time, the degree of loss depending much upon weather conditions favoring the development of this disease. Frequently, however, the fruit is harvested apparently in perfect condition but rots before it is shipped, in transit, or before it reaches the consumer. Losses in this way have been exceedingly heavy in recent years, causing much trouble between the producer and the consignee. While temperature and moisture conditions at which the fruit is held in shipment or storage and the degree of ripeness of the fruit, are factors which have much to do with the development of rot at this time, the degree of infection at harvesting time is a most important factor. During the past two seasons, considerable experimental work has been done to find some treatment which will both control the rot on the trees and prevent its development on the fruit in shipment or storage. These experiments have been carried on with Lombard, Grand Duke, and Monarch plums, and with Elberta, Smock, Gold Drop, Wark and Hill's Chili peaches. They have been uniformly successful in controlling the development of the disease and have demonstrated the value of applying later applications in the spraying or dusting program than has formerly been advised.

The material used in these experiments has been sulphur dust and lime-sulphur solution. The results show that the development of rot on the trees can be controlled by either material, as has been recommended in the regular spraying

DISEASES AND INSECTS, AND THEIR CONTROL (Continued)

schedule; but to control the rot after harvesting and insure good keeping qualities in shipment or storage, it is necessary to make an additional application of sulphur dust about one week or ten days before the fruit is harvested. A spray at this time would be quite apparent on the fruit and spoil its marketing appearance and hence could not be advised.

The spraying or dusting schedule for the control of brown rot both before and after harvesting is therefore as follows:

First—Soon after blossoms have fallen. A poison alone or with a fungicide. This is to control curculio which is also an indirect way of controlling rot.

Second—About two weeks after the first. A poison and fungicide to control curculio and rot.

Third—One month before fruit ripens. A fungicide to control brown rot.

Fourth—Ten days before harvesting. A sulphur dust to control brown rot after harvesting.

The particular kind of spray or choice between a dust and spray depends much upon the kind and variety of fruit being treated.

In the experiments that have been carried on in 1920, Lombard plums treated in this way with a dust ten days before harvesting held in good condition ten days longer than those sprayed one month before harvesting. In 1921 Wark peaches dusted just before harvesting showed 90% sound fruit after being picked five days while those not dusted had 82% of fruit infected with brown rot. Similar results are obtained with Hill's Chili and Gold Drop peaches and Grand Duke and Monarch plums. More detailed figures on the results of this work may be found in the bulletin giving the results of spraying and dusting experiments the past two years which we expect will be available in early spring of 1922.

This experimental work will be continued on a larger scale in 1922 in order to get more complete information and to develop spraying and dusting materials which may prove more satisfactory. Any common spray materials now being used on these fruits would probably give satisfactory results but could not be used for the last application because of their effect of staining the fruit."

Curl, Leaf Curl—This name has been given this disease on account of the appearance of the affected leaves. They frequently show a curled or puckered appearance. Such foliage generally falls from the trees before July. The spraying program outlined on page 60 will control the disease. Burning affected leaves and giving good cultivation may also decrease the severity of the trouble.

Leaf Rust—(See Plum).

Mildew—Early in the season before the peaches are one-half grown they are occasionally attacked by a mildew which produces white powdery patches upon the surface. As the season advances these parts become hard and brown, causing the fruit to crack. This disease can be checked by spraying with the Bordeaux mixture as soon as the fruit has set.

Yellows—Peach yellows is a disease which has so far baffled all researches as to its cause or the methods of curing affected trees. The trees first ripen their fruit prematurely, the peaches possessing distinct red streaks extending from the surface toward the pit. The disease is contagious and infected trees should be burned as soon as the disease is discovered. No cure is known.

Black Peach-Aphis—These plant lice are shining black in color. They feed upon the juices of the trees and may be found upon the leaves stems and roots. Those found above ground may be treated by kerosene emulsion diluted 15 times.

Borers—For many years peach borers have been a source of worry to the orchardist but a remedy has now been found for this which is both cheap and effective. We give it verbatim as found in various publications and suggest that this remedy be given a thoro trial.

PEACH BORER REMEDY

Great are the hopeful expectations of the fruit growers, regarding the efficient results from the use of paradichlorobenzene, which will surely be given a shorter name if it comes into general use. It is a white crystalline material. It is used by placing three-quarters of an ounce in a ring on the ground, close about the trunk of a peach tree. The gas from this material is heavier than air and settles down in the soil and kills the borers.

The material costs about three cents, at present price, for each tree. It should be used in the autumn and again in the spring.

A level space should be cleared six or eight inches wide at the base of the tree, disturbing the crust of the soil as little as possible. The material is then spread an inch away from the base of the tree. Then several shovels of earth are carefully laid over the chemical ring, so as to make a firm, cone-shaped pile without disturbing the paradichlorobenzene. This

DISEASES AND INSECTS, AND THEIR CONTROL (Continued)

must only be applied to trees six years old or older.

The crystals should be finely divided, fine enough to pass thru a ten-mesh sieve or ordinary wire window screen.

While still in the experimental stage, this process, according to Prof. Alvah Patterson of the New Jersey Experiment Station, if properly applied, will kill 90% of the peach tree borers and in a number of experiments has given 100% control. The best time to apply it in New Jersey is the last week in August or before September 10th.

Let us hope that this remedy may work out to be all that peach growers desire.

The value of the remedy, by the way, was not discovered by an entomologist, but by an Ohio farmer.

The American Pomological Society says in a bulletin issued September 15th, 1921, the following:

"There is considerable interest this year in the use of paradichlorobenzene for controlling peach borers. This is a powder which is put in a circle on the leveled soil at the base of the tree and about two inches away from the trunk. The gum is removed. The trees are then mounded with fine, compacted soil and the gas which generates kills the larvae. It is injurious on trees younger than three or four years. On three year trees a half ounce is allowed to remain only about seven days. On older trees three-fourths of an ounce is used and left about three weeks. The New Jersey Experiment Station has done some recent work in this connection. The material may be bought for 25c or 30c a pound. The following are some of the concerns which handle the material.

Hooker Electric Co., New York City.

Interstate Chemical Co., Jersey City, N. J.

Rochester Germicide Company, Rochester, N. Y.

International Chemical Co., Cleveland, Ohio.

Niagara Sprayer Company, Middleport, N. Y.

Niagara Alkali Company, Niagara Falls, N. Y.

E. C. Klipstein & Sons, 344 Greenwich St., N. Y. City.

Standard Chemical Works, Reading, Penna.

Curculio—(See under Plum).

DIRECTIONS FOR USING PARADICHLORBENZENE TO KILL PEACH TREE BORERS

Age of Trees—Use only on trees six years of age or older.

How Much—Use three-quarters ounce to one ounce per tree. Weigh out the chemical and obtain a measure that, when filled, holds this amount. Do not use more than one ounce for the largest tree.

When—Apply in September or early October when the soil is dry. This will kill the borers while young and after all eggs are hatched.

Preparation—Clear off the trash about the base of the tree for a distance of one foot. Make the soil smooth and level for a distance of six inches from the trunk. Do not dig into the surface crust more than necessary. If considerable gum is present about base of tree, remove the bulk of it. Have the soil surface level with the highest exudation of sawdust or gum, and if necessary mound the dirt to this point. The greatest number of borers will be killed if this is observed, as the gas given off by the chemical is heavier than air and is most effective below the application.

Application—The fine crystals of paradichlorbenzene are then evenly distributed in a narrow, continuous circular band on the soil about the tree. Place this ring about two inches from the trunk. Have the band about one inch wide and none of it closer than one inch to the trunk (or large roots), otherwise injury might occur.

Mounding—Place several shovels of soil (free from trash) over the ring of chemical and compact it into a cone-shaped pile with the back of the shovel. Have the first shovelful fine and pour it carefully against the trunk so that none of the crystals are pushed against the tree.

Airing—Three weeks after application, remove the dirt from the base of tree below the depth of application, and allow to remain open for a few days before being recovered. If the soil has been wet, wait from 4 to 6 weeks before uncovering. This is a precaution against possible injury to the tree.

Cost—The cost of material used is about 2½ cents per tree.

Effect—Tests in Virginia, New Jersey and Ohio gave approximately 95 per cent control of borers. This is more efficient than worming with a knife.

Quantity—One pound will be enough for sixteen trees.

DISEASES AND INSECTS, AND THEIR CONTROL (Continued)

PEAR

Leaf Blight, Fruit Spot—The leaves, stems and fruits of the pear are subject to the attack of the leaf blight fungus. Quince trees also suffer from this disease. This disease appears as soon as the first leaves are developed or if the weather is dry, it may not cause any injury until midsummer. Upon the stems the affected parts appear dead and black and the leaves fall to the ground. The fruit shows reddish spots which later turn dark. This fungus is no doubt the most serious of those which work upon these fruits but fortunately it may be controlled with comparative ease.

Fire Blight, Twig Blight—There is a bacterial disease which frequently is mistaken for leaf blight, but it is entirely distinct. It is commonly known as "Fire blight or twig blight". It causes the foliage to turn to a uniform brown, the change taking place sometimes in two or three days. The leaves do not fall from the tree but remain upon the branches, giving the parts the appearance of having been scorched by fire. There is no known remedy for fire blight. The only method of checking is to cut off the affected parts and burn as fast as they appear. The fruit spot may be prevented by use of the Bordeaux mixture. See spraying under pear.

Rust—(See under Apple).

Bud Moth—(See under Apple).

Coddlin-Moth—(See under Apple).

Curculio—(See under Plum).

Midge—The matured insect is a small, two-winged fly. It appears in early spring and lays its eggs in the young pear blossoms even before these are fully opened. The eggs hatch quickly and the larvae immediately bore into the young fruit, which they pierce in all directions. The fruit becomes swollen and misshapen and eventually drops from the trees. It has been recommended that the trees be sprayed while the trees are in blossom. A thoro application of kerosene upon the surface of the soil would destroy the larvae before they pupate.

Pear Leaf Blister—This may be controlled by spraying.

Psylla—This insect lays eggs during the warm days of April. The larvae suck the juices of the trees. They secrete large quantities of honey-dew, which runs down the stems of the tree and is a favorable medium for the growth of a dark fungus which causes the trees to appear as if covered with soot. The absence of this color is a good indication that the Psylla is not there. The affected trees become weakened, the foliage is light green or yellowish and if the tree is badly infested, the fruit and the foliage drop prematurely to the ground. The spraying program for the pear followed religiously with a sprayer having power enough to throw the spray with great force will control it effectually.

Slug—The pear slug is identical with the cherry slug. A description of this insect will be found under cherry, but it is well to emphasize the necessity of treating the pest before much damage is done.

PLUM

Brown Rot—(See under Peach).

Leaf Blister, Shot Hole Fungus—The foliage of plums and cherries is often disfigured in early summer by small circular spots about an eighth of an inch in diameter. The spots are at first of a purple color but later the color changes to brown and the affected areas gradually become loosened and drop out. The foliage then turns yellow and the trees are unable to mature their fruit. Fortunately this pest is easily destroyed. Follow spraying programs given for plums and no trouble will be experienced.

Leaf Rust—This disease is very similar to the preceding and may be controlled by following the spraying program outlined on page 58.

Plum Knot, Black Knot—Black Knots found on plum and cherry trees are not caused by insects but by a fungus which insects find to be a good breeding place and it is recommended that as soon as these knots are seen, they should be cut out and destroyed. In addition the trees should be thoroly sprayed with Bordeaux before growth starts and again when the buds are about to burst, spraying for the third time the latter part of May and then again about June 15th. If these applications are thoroly made Black Knot fungus will be controlled. In case these knots appear upon a large limb, where it is difficult to remove them, it is well to paint with pure kerosene oil.

Powdery Mildew—(See under Apple).

Rot—(See under Peach).

Borers—(See under Apple).

Bud Moth—(See under Apple).

Canker Worm—(See under Apple).

Curculio—This is the worst enemy of the plum grower. The adult is about a

DISEASES AND INSECTS, AND THEIR CONTROL (Continued)

quarter of an inch long. The eggs are laid in the young plums as soon as the blossoms fall and beetles may even be present six weeks later. By means of the snout, a hole is bored in the plum and the egg is laid within it, a crescent-shaped cut is then made about the part containing the egg in such a manner that a small lip of the green flesh is formed. Within the lip the egg is secure. It hatches in a few days and feeds for about four weeks. When full grown the larvae leaves the plum and descends several inches into the ground. It there pupates and the mature insect appears in the fall, or sometimes not until the following spring. There is only one brood each year.

Placing a sheet under the trees and jarring early in the morning will help to keep them in check. This should be continued until no more bettles are caught upon the sheets. Spraying is not altogether effective.

Plum Scale—Plums affected with this insect make but little growth and look unhealthy because so much sap is removed from the tree that they are somewhat dwarfed. In the fall as soon as the foliage has fallen, the trees should be sprayed with kerosene emulsion. If this work is thoroly done the pest can be exterminated. This application may be made any time from December to April. This emulsion cannot be applied to the leaves with safety.

Slug—(See Cherry).

QUINCE

Black Rot—The quince as well as apples and pears suffer from the fungus, which is called Black Rot. The fruit is not attacked until half grown. Bordeaux is not recommended. A clear fungicide should be used and if this is applied, the disease, which as a rule is not serious, can be held in check by two or three treatments.

Blight—(See under Pear).

Leaf Blight, Fruit Spot, Leaf Spot—Quince foliage is sometimes affected by leaf blight in early summer. These spots, which are circular, are a reddish brown color. Badly infected leaves turn yellow and fall to the ground. Sometimes trees will lose all of their leaves. This affects the fruit also, when the quinces are nearly growth. This fungus also penetrates will be altered and the flesh corky in the diseased places. The method of treating this disease has already been mentioned under leaf blight of the pear. The two are treated in about the same manner, but the applications should be made to the quince in June and in July, as these are the important ones.

Rust—This is very conspicuous on the fruit as it covers the injured portion of the quince with an orange, fringed-like growth. This fungous also penetrates the the twigs and often causes knots to appear, resembling the black knot of the plum. The history of this fungus is similar to that causing the rust of apples which refer to and its treatment, which is found under Apple.

Borers—(See Apples).

Slug—(See Cherry).

RASPBERRY

Anthracnose, Cane Rust, Also Leaf Curl and Yellows—This fungus attacks Raspberries, Blackberries and Dewberries and appears during June and July. It attacks the lower part of the canes first. The leaves are also attacked to a limited extent. When the fruit stems are destroyed the berries are frequently prevented from ripening and dry up on the bushes. This disease has not yet been successfully treated. Spray thoroly as directed in the spraying program on page 61.

Perhaps the best method is to cut off all wood at the ground in early fall or spring which, of course, means the loss of a year's crop, but would probably prevent the disease from gaining much headway during the next few years and especially if the bush is sprayed as suggested.

Orange Rust, Red Rust—This fungus is found upon Blackberries and Raspberries and the plants infected cannot be cured. The only remedy is to dig out and burn.

Cane Borer—This insect is a slender black beetle about one-half inch in length and lays its eggs in June in the young shoots which grow from the base of the plant. A row of punctures is made above and below the place where the eggs is inserted. When hatched the grub begins to burrow down and by winter it has reached the roots. The adults appear the following spring. The puncture in the tips where the eggs are laid causes the tips to wilt and may be readily seen. They should be cut off below the injured part and destroyed. The canes should also be watched during late summer and any that are found to be wilting should be cut off close to the ground and burned.

Saw Fly, Raspberry Slug—During the months of June and July the Raspberry Saw Fly may be seen among the canes. It is black and has four wings. The larvae feed upon the foliage of the plants and in some instances the foliage will be almost entirely devoured. Follow the spraying program on page 61, which will take care of this insect.

DISEASES AND INSECTS, AND THEIR CONTROL (Continued)

STRAWBERRY

Leaf, Blight, Rust—The foliage of the Strawberry is subject to the attack of a fungus which may appear at any time during the growing season. A purple spot is the first indication, gradually increasing in size from an eighth to a quarter of an inch in diameter. This purple color later changes to a reddish brown. This disease is frequently very serious. Spraying the plants with Bordeaux mixture will check the trouble. Bearing plantations will derive benefit from a treatment made when growth starts in the spring and from another when the first blossoms open. After harvesting the fruit, the foliage affected should be mowed off, removed and burned. The new growth should then be sprayed at intervals of three or four weeks for two or three applications.

Mildew—Affected leaves curl and appear as if suffering from want of water. Also grows on the berries. This disease is rarely serious. Spray the plants with a fungicide containing copper. Sulphur, if scattered upon the plants and between them, will check the disease.

Leaf Roller—The larvae of this insect mature in June after having spun a web causing the familiar rolling of the leaflets. The soft tissues are eaten and what remains turns brown. Spray the plants during August with an insecticide such as Paris Green or London Purple. Two applications may be made or the foliage cut and burned.

Saw Fly, Slug—For this insect, cut and burn the foliage as soon as the crop is harvested or spray with hellebore or Paris Green before there is any danger of poisoning the fruit.

Tarnished Plant Bug—This bug is about a quarter of an inch long, varying in color. It sucks juices of growing plants, preferring the young fruits, which are in consequence dwarfed. Pyrethrum powder dusted freely upon affected plants will destroy the insects. This is the best remedy.

Sanitation is the keynote of successful fruit growing. Spray to prevent disease, not to cure it.

SPRAYING

CHAPTER VII.

Including Formulas for Insecticides and Fungicides.

Contrary to the general opinion, spraying is not so much for the purpose of killing insects as for prevention. In any orchard, or on any fruit farm, disease and insects may come but many will never appear. The successful orchardist, instead of waiting until disease, and the various insects that prey upon fruit make their appearance, follows a regular spraying program adapted to their locality and the varieties they grow so as to keep trees in perfect health continually and prevent insects from getting a foothold.

Sprays are not intended as a cure-all but as a preventative. In other words, sanitation is the keynote to success and freedom from disease, which insures clean, beautiful fruit, if the orchard receives the proper cultivation.

The fruit grower then, and especially those who are entering this work for profit, will be prepared to spray. This requires an outfit adequate to put the spray on all parts of the tree with sufficient force and cover same completely. There are at present many sprayers of different makes, all of which are good, some possibly better than others, it being a matter of choice. Having the outfit and sprays, the reader is referred to pages 52-61, on which a complete spraying program for the different varieties of fruit is mentioned. These sprays cover the entire season and if faithfully followed with intelligent application, the grower will be insured of fine fruit and an orchard that is healthy.

Arsenate of Lead The best stomach poison for biting and chewing insects. It adheres well to the foliage and when applied in proper amounts does not cause injury like Paris Green. Usually used at the rate of 1 or 3 lbs. to 50 gallons of water, Bordeaux or Lime-Sulphur solution. Can be purchased as either a paste or powder. Do not make stronger than 1 lb. to 50 gallons solution for peaches. If Arsenate of Lead is mixed just with water and not Bordeaux or Lime-Sulphur it is advisable to add 3 or 4 lbs. of fresh stone lime to every 50 gallons of solution.

Paris Green Mixture Use 1 pound of pure Paris Green in 150 gallons of water. Add to this 2 pounds of slaked lime. Strain carefully before using. For most purposes, we would advise combining the Paris Green with Bordeaux mixture, in which case the extra 2 pounds of lime mentioned may be left out, on account of the lime contained in the Bordeaux mixture.

FOR SUCKING INSECTS

Whale-Oil Soap Mixture This mixture may be used for aphis and plant-lice during the summer season, at the rate of 1 pound of the whale-oil soap in 4 to 6 gallons of water. Dissolve in hot water and can dilute with cold soft water afterwards.

Tobacco Extracts Can be made at home with 1 lb. tobacco stems or dust to 2 gals. water. Use hot water (almost boiling) for one hour. Not as satisfactory as the commercial extracts. "Black Leaf Extract" and "Black Leaf 40" are both good. The latter contains 40 per cent pure nicotine and is extremely concentrated. One of the best contact insecticides. Use "Black Leaf 40" at the rate of 1 gal. to 800 gals. water or "Black Leaf" 1 gal. to 60 gals. water. It is a good idea to mix 2 lbs. of whale oil soap to 50 gals. of tobacco solution.

Miscible Oils Used mostly as dormant sprays for San Jose scale and the like. A number of different brands on the market. Follow directions of the manufacturer.

FUNGICIDES

Lime-Sulphur The Lime-Sulphur mixture is the standard remedy for the San Jose scale. We recommend that you get the commercial Lime-Sulphur; full directions go wtih it. Every gallon of the mixture makes about eleven gallons of solution when properly mixed with water. This will cost when mixed about one cent a gallon when used for scale and is better, all things considered, than trying to make your Lime-Sulphur at home.

Self-Boiled Lime-Sulphur This is a mechanical mixture of the two substances, and is really not boiled, the heat being supplied by the slaking lime. In a small barrel or keg place 8 pounds of good quicklime. Add water from time to time in just sufficient amounts to prevent burning. As soon as the lime begins to slake well, add slowly (preferably through a sieve) 8 pounds of sulphur flour. Stir constantly, and add water as needed. As soon as all bubbling has ceased, check further action by adding a quantity of cold water, or pour into a barrel or tank and make up to 50 gallons. Keep well agitated. Very effective against peach scab and brown rot.

Bordeaux Mixture The strength of a solution of this mixture is expressed by such a formula as 4-4-50. The first figure refers to 4 lbs. of copper sulphate, the second to 4 lbs. of fresh stone lime and the third to 50 gallons of water. The more copper sulphate used the more concentrated the solution will be. Use fresh stone lime or hydrated lime—not air slaked lime. It is desirable to make up first of all stock solutions of both lime and copper sulphate. To make a Bordeaux mixture of 4-4-50 strength, take some of the copper sulphate stock solution containing 4 lbs. of the chemical and pour into the spray tank. Add about 30-35 gallons of cold water and then some of the stock solution, containing 4 lbs. of lime. Next add enough water to make 50 gallons of the mixture. Never use Bordeaux that has stood over night. Always use it fresh. If using hydrated lime use one-half more by weight.

Combination of Sprays Commercial Lime-Sulphur can be mixed with either Arsenate of Lead or Tobacco Extract or both. A good combination to control both leaf eating and sucking insects is 5 lbs. soap (whale oil soap is good), 1 gal. of "Black Leaf" extract, 2½ lbs. Arsenate of Lead and 50 gal. Water. If this solution is to be kept any length of time, add 1½ lbs. of lime. "Black Leaf 40" should not be mixed with others until just before using.

Read pages
17 to 19

SPRAYING PROGRAM FOR APPLES

Spray No.	When to Apply	Materials to Use	What For
1 _____	When leaf buds begin to show green before leaves appear ___	Lime-sulphur, 1 part—Water, 8 parts Or— Soluble sulphur, 12½ pounds to 50 gallons of water	Scale Apple scab Aphis eggs Mites eggs
* Special ___	Pink Spray or as soon as the blossom buds separate in the clusters, while they are "in the pink" _____	Lime-sulphur—1¼ gallons to 50 gallons of water plus 2 pounds of Arsenate of Lead (powder) or 4 pounds paste, adding Black Leaf 40, 1 pint to every 100 gallons.	Canker Worm Scab
2 _____	Just after petals fall _____	Lime-sulphur, 1¼ gallons plus arsenate of lead, 1 pound powder or 2 pounds paste to 50 gallons of water. If powdered lime-sulphur is used, follow recommendations of the manufacturers. Do not use soluble sulphur with arsenicals.	Apple Scab Sooty Fungus Black Rot Codling Moth Curculio Canker Worms
3 _____ Not always necessary. See text.	10 to 14 days after Spray No. 2	(Same as No. 2). Read Details of Application, under Spray No. 3, which follows:	(Same as No. 2)
4 _____	9 to 10 weeks after Spray No. 2 (July 15 to August 1) _____	Lime-sulphur, 1¼ gallons to 50 gallons water Or— Bordeaux mixture (3-5-50) plus arsenate of lead powder, 1 pound to 2 pounds paste. (Use Bordeaux if bitter rot or blotch is prevalent)	Codling Moth Blotch

* Special sprays are not numbered as they are not part of the customary program but are supplementary sprays for emergency conditions.

DETAILS OF APPLICATION

Spray No. 1. (Dormant spray). The dormant spray should be given to all orchard trees. Besides scales, the fungous disease known as apple scab can be checked, also aphis eggs and mites eggs can be largely destroyed with this spray. Use lime-sulphur solution—that is the commercial concentrate, testing 33° Beaume or thereabouts, diluted with 8 parts water.

For good results, spray from two or more sides of the trees with the wind, when the temperature is 50 degrees F. or warmer, and the bark is dry. If aphis eggs are not abundant, good days in February and March should be utilized; but if, because of aphis eggs or other reasons, delay is unavoidable, it is better to spray even when the bloom is showing pink than to omit it on trees that are infested with scale. When aphis eggs are abundant, make the application just as the leaf buds show green before the leaves appear. If the work is not done thoroughly, it is about as well not to do it at all, for the entire cost of the work will go for naught. For a tree 15 feet high and with an equal spread of top use about 2 to 5 gallons of diluted lime-sulphur spray;

for a tree 20 feet tall and with an equal spread of top, 5 to 10 gallons; for a tree 25 to 30 feet high and with an equal spread of top, from 10 to 15 gallons. Every bit of bark and bud surface must be wet with the spray. Inspect the work in a week or 10 days; and, if any spots escaped being covered, repeat the application over such areas. A good pressure is desirable to drive the spray into cracks and crevices. Power sprayers carrying from 100 to 250 pounds pressure are best, but good results can be had with barrel and hand pumps. The spray gun can be used on pumps having a capacity of 6 to 10 gallons of spray per minute with pressures from 175 to 250 pounds.

Canker Worm Spray. If canker worms (measuring worms) appear in numbers on the young leaves in May, apply arsenate of lead immediately, 2 pounds of powder or 4 pounds of paste to 50 gallons of water or lime-sulphur solution. If the worms are an inch or more in length use 2½ pounds of powdered arsenate of lead (or 5 pounds of paste) in water or lime-sulphur solution, or 2 pounds of powdered arsenate of calcium in 50 gallons of lime-sulphur solution.

Spray No. 2 (Calyx-cup spray). This spray can never be omitted by the man who sprays at all. Freedom from worms in the apples depends upon it.

Lime-sulphur solution, commercial concentrate, 1¼ gallons to 50 gallons of water along with arsenate of lead powder, 1½ pounds (or 3 pounds of the paste) to 50 gallons of spray is recommended. If lime-sulphur powder is used, the manufacturers recommend 2½ pounds in 50 gallons of spray as the right proportion. If apple lice or aphids are numerous, it is sometimes worth while to add nicotine sulphate, 1 part to 800 of spray (1 pint to 100 gallons). Apply just after the blossoms fall. Do not use soluble sulphur for this application as it is apt to cause severe burning of the foliage when combined with arsenicals.

This application should be very liberal; both surfaces of the leaves should be well bathed with spray, and it should be driven into the cup of every blossom. The tree will be dripping profusely when it is finished. Trees 15 feet high and with an equal spread of top will require from 3 to 5 gallons of spray; trees 20 feet tall and with an equal spread of top, from 8 to 12 gallons of spray; trees 25 to 30 feet tall and with an equal spread of top, from 15 to 20 gallons of spray. A driving mist directed into the flower-cups from a tower by means of a bamboo pole and angled nozzle will nearly always yield satisfactory results. Or, one spray gun may be used on machines having a capacity of 6 to 8 gallons and two on machines delivering 12 to 20 gallons per minute and able to maintain pressures of 175 to 250 pounds, but the gun should be 6 to 10 feet away from the trees to prevent injury to the leaves and russeting of the skins of the young fruit. Adjust the gun to insure a driving fog spray. The spraying should begin when about 90 per cent of the petals have fallen and before the weight of the young fruit has turned the cups toward the ground. Ten days after bloom has fallen is close to the outer limit of the period within which this spraying can be satisfactorily done.

Spray No. 3. This treatment is generally omitted by orchardists who have sprayed regularly for several years and have learned how to apply Spray No. 2 in a thorough manner. If the orchard has not been sprayed according to a regular schedule for at least two or three seasons, do not omit this treatment. The composition of the spray is ordinarily the same as for Spray No. 2, but if blotch is present, use Bordeaux (3-5-50). The formula (3-5-50) means 3 pounds of copper sulphate (bluestone), 5 pounds of hydrated lime and 50 gallons of water.

Bordeaux Test. If sufficient lime is not used in the mixture there is danger of injury to the foliage. To test the composition dip a clean steel blade into the solution and hold it there for a minute or more. If a thin film of copper forms on the blade, more lime must be added. Or prepare a solution of ferrocyanide of potassium by dissolving an ounce of the substance in 4 or 5 ounces of water. Dip out a portion of the Bordeaux mixture into a shallow, white porcelain dish and allow a drop or two of the ferrocyanide of potassium solution to fall into it. If a brownish red coloration is noted lime must be added until no color is seen.

SPRAYING PROGRAM FOR PEAR AND QUINCE

Spray No.	When to Apply	Materials to Use	What for
1	When leaf buds show green before leaves appear	Lime-sulphur liquid, 1 part—Water, 8 parts. Or— Miscible oil—1 part Water—15 parts	Scale Aphis eggs Mites eggs Scab
2	A delayed dormant for psylla when blossom buds are in cluster stage	Lime-sulphur 6¼-50	
3	A pink spray Soon as petals fall	Lime-sulphur 1¼-50 plus Arsenate of Lead Also Black Leaf 40 for Psylla Or— Bordeaux mixture (3-5-50) plus arsenate of lead powder, 1 pound (2 pounds paste).	Scab Codling Moth Pear Slug Scab Sooty Fungus Leaf-Spot
4	9 to 10 weeks after No. 2 (July 15 to August 1)	Bordeaux mixture (3-5-50) plus arsenate of lead powder 1 pound (2 pounds paste) to 50 gallons of water.	Second Brood Codling Worm Scab Leaf-Spot

If scab or leaf-spot is prevalent, follow the spraying programs for apple in their entirety, choosing the Bordeaux mixture in all cases where alternative sprays are given and make preblossom spray with Bordeaux mixture.

Details of application are the same as for the corresponding sprays for apple, viz, the dormant spray, first codling worm or petal spray, and the second codling worm or midsummer spray.

Cultivation promotes growth and improves the sanitary condition of your orchard.

SPRAYING PROGRAM FOR PEACH

Spray No.	When to Apply	Materials to Use	What for
1 _____	In fall, after leaves drop, on favorable winter days above 50° F. in February or March or any time before the buds begin to swell. After buds are swollen it is too late to control leaf curl _____	Lime-sulphur solution, 1 part—water, 8 parts. Or— Soluble sulphur 12½ pounds to 50 gallons.	Scale insects Peach leaf curl
2 _____	After bloom has fallen when husks on young fruit are shedding _____	1¼ pounds arsenate of lead powder (2½ pounds paste) in each 50 gallons of spray.	Curculio Scab Brown Rot
3 _____	2 weeks after Spray No. 2____	(Same as No. 2) and Self-boiled Lime-sulphur.	(Same as No. 2)
4 _____	1 month before fruit ripens _____	Self-boiled Lime-sulphur.	Brown Rot

Prune---

but prune
intelligently.

SPRAYING PROGRAM FOR PLUMS

Spray No.	When to apply	Materials to Use	What for
1 _____	In late fall, after leaves have fallen, on favorable winter days above 50° F. in February or March, or in spring before leaves appear ___ Pink spray _____	Lime-sulphur solution 1 part, water 7 parts. Or— Miscible oil 1 part, Water 15 parts Or— Soluble sulphur, 12½ pounds to 50 gallons. Lime-sulphur 1¼ gallons to 50 gallons water.	Scale insects
2 _____	When bloom has fallen and husks are pushing off young fruit _____	On American and Japanese varieties, self-boiled lime-sulphur (8-8-50) plus arsenate of lead powder 1¼ pounds (2½ pounds paste). Or— On European varieties and hybrids, commercial lime-sulphur 1 gallon to 50 gallons of water plus arsenate of lead powder 1¼ pounds (2½ pounds paste). Or— If curculio is serious, use Bordeaux mixture (3-5-50) plus 2 pounds arsenate of lead powder (4 pounds paste) and add 2 pounds of dissolved soap to each 50 gallons of spray as a sticker.	Curculio Brown Rot
3 _____	2 to 3 weeks after Spray No. 2____	(Same as No. 2)	Curculio Brown Rot
4 _____	4 to 5 weeks after Spray No. 2____	Same as No. 2, preferring self-boiled lime-sulphur (8-8-50) plus arsenate of lead powder 1¼ pounds (2½ pounds paste).	Curculio Brown Rot

Only self-boiled lime-sulphur should be used on American and Japanese varieties in foliage. On all European varieties and their hybrids, Bordeaux mixture (3-5-50) may be substituted for self-boiled lime-sulphur for treatments numbered 2, 3 and 4.

Black knot is controlled by cutting out the knots December to February and burning them. This trimming must be followed by the dormant spray to kill the spores adhering to the bark of healthy limbs.

SPRAYING PROGRAM FOR YOUNG ORCHARDS NOT BEARING

Young orchards of all fruits not in bearing should receive the dormant spray and at least one foliage spray soon after the leaves are fully expanded. For all foliage sprays except peach, American and Japanese plums and sweet cherries, use lime-sulphur solution 1¼ gallons to 50 of water, plus 1 pound powdered arsenate of lead (2 pounds paste). Young peach rarely need a foliage spray. If diseases appear on any of these fruits consult the proper State authorities.

If leaf-eating insects appear late in the season, spray with arsenate of lead, 1 to 1½ pounds powder (2 to 3 pounds paste) to 50 gallons of water.

If young grasshoppers are numerous and the orchard is in cover crop, it is generally best to let the crop stand and not mow. The grasshoppers will not then be driven to feed on the leaves.

SPRAYING PROGRAM FOR CHERRIES

Spray No.	When to Apply	Materials to Use	What for
1 _____	Just after blossoms fall and husks are shedding from young fruit _____	On sour varieties concentrated lime-sulphur 1 gallon to 50 of water, or use Bordeaux mixture (3-5-50). Add to whichever is used 1¼ pounds arsenate lead powder (2½ pounds paste). Add nicotine sulphate, 1 pint to 100 gallons of whichever spray is used if aphids are numerous. If curculio is bad, use Bordeaux (3-5-50) and 2 pounds dissolved soap plus 2 pounds arsenate lead powder (4 pounds paste). On sweet cherries, self-boiled lime-sulphur (8-8-50) plus arsenate of lead powder 1¼ pounds (2½ pounds paste) to 50 gallons.	Curculio Aphids Cherry Slug Leaf-Spot or Shot-Hole Fungus Brown Rot
2 _____	2 weeks after Spray No. 1 when fruit begins to color. Very important application _____	Commercial lime-sulphur liquid, 1 to 50 for both sweet and sour cherries. Or— Self-boiled lime-sulphur (8-8-50) preferred for sweet cherries.	Curculio Aphids Cherry Slug Leaf-Spot or Shot-Hole Fungus Brown Rot
3 _____	After fruit is picked _____	Commercial lime-sulphur liquid, 1 to 50 for both sweet and sour cherries.	Leaf-Spot Slugs

SPRAYING PROGRAM FOR GRAPE

Spray No.	When to Apply	Materials to Use	What for
1 _____	When new shoots are 6 to 10 inches long _____	Bordeaux (3-5-50)	Black Rot Downy Mildew
2 _____	10 days before bloom opens ___	Bordeaux (3-5-50)	Mildew Black Rot
3 _____	3 to 5 days after falling of bloom_	Bordeaux (2-3-50) plus arsenate of lead powder 1½ pounds (3 pounds paste) and 1 pound resin soap for sticker in each 50 gallons. Use trailer method and pump pressure of 175 pounds.	Grape Berry Worm Grape Root Worm Mildew Black Rot Anthracnose
4 _____	Just before grapes touch in clusters, about 1 month after bloom ____	(Same as No. 3)	(Same as No. 3)
5 _____	Omit unless worms are very numerous. Then make application near 20th to 25th of July, when eggs are being deposited on skins of fruit. Also watch for leaf hoppers and spray just before the first winged adults appear using Black Leaf 40 with Bordeaux	Arsenate of lead 1½ pounds (3 pounds paste) in 50 gallons of Bordeaux.	Grape Berry Worm

For all grape sprays use stone lime, if obtainable, to avoid injury to foliage. The Bordeaux formula (2-2-50), stone lime being used, leaves the smallest amount of spray adhering to the fruit at harvest.

For Leaf Hoppers spray with Black Leaf 40 with Bordeaux, using 1 pint to 100 gallons of water with two or three pounds of soap, while insects are young, and before they can fly. Try to hit each insect for only those hit by the spray are killed. Later in the fall clean up all rubbish and burn after cold weather sets in. The leaf-hopper passes the winter in rubbish.

Climbing Cut Worms—Use bands of cotton batting or bands of sticky mixture, also sprinkle poisoned bran near the bases of the vines.

Do not use machines with set nozzles on spars. Use power machines with hose attached which are directed by hand. This is called the trailer method. If resin soap cannot be procured, laundry soap may be used, 2 pounds in 50 gallons of spray. Be sure all soap is dissolved before it is put in the spray tank and avoid gumming up the pump. First put Bordeaux in tank, next the soap, and lastly the arsenate of lead. Have agitator running while filling.

SPRAYING PROGRAM FOR BLACKBERRY AND RASPBERRY

Spray No.	When to Apply	Materials to Use	What for
1	When dormant in spring	Lime-sulphur, 6¼ gallons to 50 gallons of water.	Anthracnose
2	When new shoots are 6 inches long	Lime-sulphur, 1 gallon to 50 gallons of water.	Anthracnose
3	Just before flowering	(Same as No. 2)	(Same as No. 2)

Anthracnose may be avoided by locating new plantings a considerable distance from old ones and by digging the plants before growth has started in spring, if one is careful to remove and burn all of the old canes. After the first year spraying must be resorted to.

SPRAYING PROGRAM FOR CURRANT AND GOOSEBERRY

Spray No.	When to Apply	Materials to Use	What for
1	While dormant in fall, winter or spring	Any of the standard dormant or scale sprays recommended in these tables for other fruits.	Scale insects
2	When leaves are unfolding	Bordeaux (4-4-50)	Leaf-Spot Cane Wilt Mildew
3	Just before flowering	Bordeaux (4-4-50)	Leaf-Spot Cane Wilt Mildew
4	Soon after fruit is set	Bordeaux (4-4-50) plus arsenate of lead 1½ pounds of powder (3 pounds paste). If aphids are appearing also add nicotine sulphate, 1 pint to 100 gallons of spray.	Leaf-Spot Mildew Currant Worms Aphids
5	2 weeks after Spray No. 3, if worms are present	Same as for Spray No. 3, or hellebore may be used instead of arsenate of lead.	(Same as No. 4)
6	After fruit is picked	Bordeaux (3-5-50)	Leaf-Spot Anthracnose

If no scale is present, Spray No. 1 may be omitted.

SPRAYING PROGRAM FOR STRAWBERRY

	When to Apply	Materials to Use	What for
1 _____	When leaves are about one-half grown, before blooming. If the beds are young, spray 1 week later than the old beds.	Bordeaux mixture (3-5-30)	Leaf-Spot
2 _____	After fruit is picked _____	Mow the vines close to the ground and burn them on a windy day or remove and burn; or spray the new growth with Bordeaux (3-5-50). Drouth following such a burning sometimes prevents a crop the next year.	Leaf-Spot

ASPARAGUS AND RHUBARB

CHAPTER VIII.

Asparagus This is one of the earliest and most delicious of spring vegetables. Everyone having enough available space to put in a bed for their own use should not fail to do so.

Beds usually are formed by setting roots, which can be procured of us. The beds should be prepared by deep plowing or spading and thoroughly enriching the ground with stable manure; a moist sandy loam soil is best.

After the plants are well started, give frequent and thorough cultivation. Early the next spring spade in a heavy dressing of manure and about one quart of salt and double the quantity of wood ashes to each square rod and cultivate well as long as the size of the plants will permit, or until they die down. The next season the bed may be cut over two or three times, but if this is done, all the shoots, no matter how small, should be cut. After the final cutting, give a good dressing of manure, ashes and salt. Cultivate frequently until plants meet in the rows.

In autumn when the tops are fully ripe and yellow, they should be cut and burned. A bed 15x50 feet, requiring about 100 plants, if well cultivated and manured, should give an abundant supply for an ordinary family and continue productive for eight or ten years. Plant in rows.

Rhubarb Rhubarb may be grown in most any well-drained soil, provided it be rich and made friable by deep culture. Rich, deep but rather light loam yields the finest product. Set the root stocks out in the fall or early spring. They should be set in the richest of land, 3 feet apart each way. The stalks should not be pulled up until the spring of the following year, and then only to a small extent. Good stocks for use will be produced the second year. The only culture needed is to keep the soil loose, free from weeds and to use plenty of manure. Stable manure is best. In gathering rhubarb, the stocks should be removed from the crown by a jerk downward and sideways and care should be taken not to pull the buds from the crown. There is little danger of pulling more leaves than the plant can stand without injury, but in the case of a young plantation it would not be well to remove more than one-half of the leaves at any one time. The seed stalks should be cut off as soon as they appear, so as to throw their strength into leaves and to prevent the formation of seeds.

For the first year the ground between the permanent rows may be used for a crop of lettuce, beans, or any low-growing vegetables, but after the second year the leaves will cover the ground and require it for their full development. Every autumn give the rows a liberal covering of coarse manure, which should be carefully worked in the next spring so as not to cut or injure the roots.

THE GREENING SPECIALTIES

The Greening Nursery Company wish to call your attention to the fact that since the inception of their business, they have been offered many thousand "seedlings" or so-called new varieties for introduction.

When these prove distinctive enough to warrant their propagation we are delighted to do so. But out of the thousands offered very few have the necessary qualifications to place them among the desirable fruits for either home or commercial use.

Among the now well known varieties of fruit, we take pride in the fact that we are the introducers of the following, all of which have proven their worth and desirability:

THE WINTER BANANA APPLE
THE AUSTRIAN PRUNE PLUM
THE BANNER PEACH
THE NEW PROLIFIC PEACH
THE KIHLKEN SMOCK PEACH
THE SEPTEMBER MAMMOTH PEACH
THE SOUTH HAVEN PEACH

And our two great specialties,

THE BOSC PEAR (double-grafted)
THE STEELE'S RED APPLE (double-grafted)

which, altho not introduced by us, were made desirable by our system of double grafting, thus placing them among the varieties profitable for either home use or commercial growers.

Ask for catalog.

THE GREENING NURSERY COMPANY
Monroe, Michigan.

THE WINTER BANANA APPLE

This is one of our introductions now famous for its worth and beauty. First introduced in 1890 it won instant recognition and is known to every horticulturist and nearly all users of fruit in America.

An early and prolific bearer, a long keeper and of great beauty it is of distinctive merit either for market or home use.

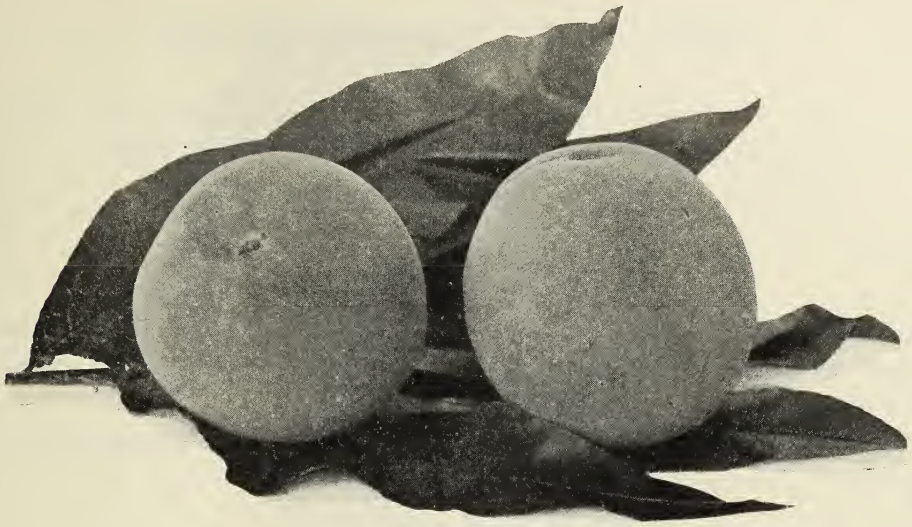
Let us send you the history which is given in our catalog on pages 27, 28 and 41.

THE AUSTRIAN PRUNE PLUM

We introduced this Plum to the public over fifteen years ago, and we have never as yet been able to propagate enough to supply the demand.

There isn't a Plum in existence its equal, in size, beauty or bearing qualities.

See our catalog pages 57, 60 and 61.



The South Haven Peach

THE "PEACH" OF PEACHES
For Commercial Growers
SOUTH HAVEN

Commercial growers have long wanted a peach having the beauty and shipping qualities of the famous Elberta, which would come in early enough to lengthen the season. Our new South Haven is the answer.

Possessing all the qualities demanded in a commercial peach similar to the Elberta it has in addition others which make it so distinctive as to demand attention.

These other qualities are: Its extreme hardiness and its season, which is ten days to two weeks earlier than Elberta, and with Yellow St. John, lengthens the season and enables the growers of the north to get the high prices offered for stock at this time.

Read pages 51 to 55 of catalog and ask for our PEACH FACTS, a circular giving full particulars.

This Peach can only be secured from us, the introducers. Place orders early. Our stock of this variety was sold one year ahead of production for the first four years after introduction so great was the demand.

"BOSC" THE PEAR OF PEARS

Like the Steele's Red Apple described below, the Bosc Pear because of its indifferent growth, was planted very sparingly.

However, we have circumvented nature, and by

Double-Grafting

it are able to produce a handsome tree, which will bear as quickly as any standard pear. This variety may now be grown with satisfaction by all.

In quality it is undisputed as the most delicious dessert pear known. Refer to our catalog pages 24, 45 and 46.

AN APPLE OF DISTINCTION

Steele's Red (Canada Red or Red Canada)

Among the many apples some have such wonderful flavor and keeping qualities that they are distinctive. The Steele's Red is one of that sort. THIS APPLE is admitted by all Horticulturists as one of the very highest quality, but because of its indifferent growth and slowness of coming into bearing it has not enjoyed the popularity of other and inferior varieties.

We circumvent its natural habit by top-working it on vigorous stock of other varieties and thus induce it to bear the same as other standard varieties (six or seven years).

We offer this variety in

Double-Grafted

stock and recommend it to be planted in every home as well as commercial orchard. It is a delicious dessert apple—a long keeper and when grown commercially invariably brings fom One to Two Dollars per barrel more than other varieties on all markets. See our catalog on pages 23, 24 and 40.

THE GREENING NURSERY COMPANY
Monroe, Michigan.

Paul's Scarlet Climber

THE NEWEST CLIMBING ROSE

Paul's Scarlet Climber

New Roses are added each year to the desirable kinds, but here is one incomparable in brilliancy of color, which is a vivid scarlet mantained without burning or bleaching until the petals drop.

Flowers are of medium size, semi-double. They are very freely produced in clusters of from three to six flowers each on much branched canes, the plants being literally covered with flowers from top to bottom. Strong climbing habit and perfectly hardy.

Awarded the Gold Medal by the National Rose Society, also the much coveted Gold Medal at the Bagatelle Gardens, Paris, France.

Write for catalog and prices.

THE GREENING NURSERY COMPANY
Monroe, Michigan.

THE GREENING NURSERY COMPANY'S PUBLICATIONS

We have issued in the years gone by many circulars, booklets, manuals and treatises on Horticulture as a help to our customers—as an aid to our salesmen and for the betterment of home beautification in the interest of our Landscape Department.

Many of these circulars and booklets were issued to cover a particular phase of fruit growing and ornamental gardening. The editions are now exhausted and they will not be reprinted.

But we have four standard publications that are of interest to both fruit growers and those who wish to beautify their homes.

Greening's "An America More Fruitful, An America More Beautiful" First, and not at all least in value, is our general nursery catalog "An America More Beautiful", or an "America More Fruitful", which is sent free of charge to anyone interested. This catalog contains full descriptions of the varieties of fruits and ornamental stock propagated by us. The descriptions may be relied upon as being scientifically accurate and this catalog is in great demand by teachers of botany in different High Schools as a book of reference for their pupils.

Book of Horticulture Is the book you have in your hand, namely "Greening's Book of Horticulture", which is printed in your interest and contains the latest and best practice in Horticultural matters. The price of this book is 50c postpaid and copies will be mailed on receipt of that amount.

Greening's Pictorial System of Landscape Gardening This is a book of 166 pages. The size is 10 by 12 inches. It is bound in half morocco and contains over 200 studies in Landscape Gardening. Beautifully illustrated in colored half-tone plates. This book is an inspiration to anyone interested in Landscape Gardening, or wishing to beautify their home. Suggestions derived from the study of the Plates will be many, and the beautiful half-tones will thrill any lover of nature. The price of this book is $5.00 per copy, sent postpaid on receipt of that amount.

Greening's "The Home Beautiful" This is our newest publication issued in the fall of 1921. It contains 114 pages of text and illustrations. Is printed on the finest paper obtainable; bound in flexible imitation leather or in full leather, as you may prefer. It contains 120 illustrations of photographic studies and six designs, and the book is so plain in every respect that the amateur as well as the professional gardener will actually get more real benefit and wholesome delight from its pages than from any similar work extant.

The pages are 9½ by 12 inches in size. The index is also so complete and comprehensive that any tree, shrub or plant can be found instantly by either its botanical or common name. The illustrations are unique and distinctive, because they show actual homes which have been beautified by ourselves and other reliable Landscape Architects. All of these are keyed and numbered that the reader may identify each variety of tree, plant and shrub used in the plan and thus familiarize himself with the habits, etc., of each.

An outstanding feature of this book is the matter relating to the particular plant to use for securing typical effects. This embraces flowers, shrubs and perennials and this chapter is especially valuable for amateurs because it gives trees, shrubs or perennials alphabetically arranged so that the plant for effect desired can be found instantly. The text relating to the plans shown is so easily understood and so comprehensive that every lover of nature and a beautiful home will want this book for reference, because it answers every qustion as to What to Plant, Where to Plant and How to Plant, Evergreens, Shade and Ornamental Trees, Flowering Shrubs, Perennials, Annuals, Vines, Roses, Bulbs and Ornamental Grasses.

This book will be sent postpaid to any place in the United States on receipt of the prices, full leather binding $5.00 and the imitation leather, flexible binding, $4.00. Canadian customers will kindly add fifty cents more to prices named.

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Monroe, Michigan.

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It is in the selection and artistic grouping of what is planted that makes for attractive appeal as the planting develops year after year.

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You are under no obligation to us for these suggestions. If they are accepted by you, you will not only have a home of beauty, however inexpensive your house may be, and add a value to your property, should you desire to sell, of several hundred percent as well as making it more desirable in every way.

Write us for particulars, mentioning this offer.

The Greening Nursery Company

Landscape Department

Monroe, Michigan